

APRIL, 1956

A Magraw-Hill Publication—Price 50a

Efficient Haulage

Amherst chooses overland haulage from new portal. p 54

Flexible Drilling

Scattered reserves exploited with truck drill p 60

50 Biggest Mines

Annual roundup of top producers among U.S. Mines . p 67

Careers in Coal

Picture story of life in modern mining communities . p 68

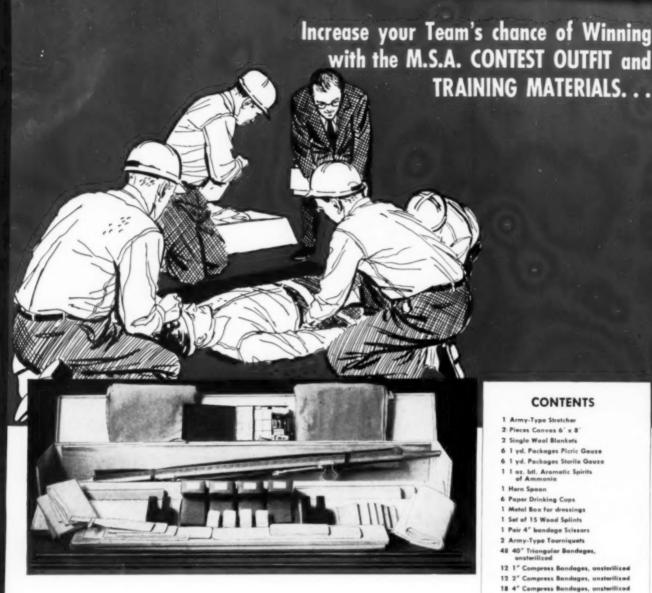
Dense-Medium Washing

How the job is done in Britain's largest plant p 74

Building Big Dipper Sticks

Major-league welding in a strip-mine shop p 78

FULL CONTENTS ON P 5



Your team gains greater speed and efficiency, both in training and in actual competition, with the M.S.A. Contest Outfit and training materials. All required materials are neatly arranged, easy to see, instantly accessible. This means you can select the right materials, at the right time and bring your team to a quick, point-winning solution to every accident problem.

The Contest Outfit box is made of strong steel and finished in white. Its design, resulting from years of experience with first aid practice and competition, prevents loss of materials, and contributes to neatness and efficiency. Strong handles on each end of the box make it easy to carry. Write for details.

CONTENTS

- 1 Army-Type Stretcher
- 2 Pieces Canvas 6' x 8
- 2 Single Wool Blankets
- 6 1 yd. Packages Picric Gauze
- 6 1 yd. Packages Storile Gauza
- 1 1 oz. btl. Arometic Spirits of Ammonia
- 1 Hern Speen
- 6 Paper Drinking Cups
- 1 Metal Box for dressings
- 1 Set of 15 Wood Splints
- 1 Pair 4" bandage Scissors 2 Army-Type Tourniquets
- 48 40" Triangular Bandages, unsterilized
- 12 1" Compress Bandages, unsterilized
- 12 2" Compress Bandages, unsterilized
- 18 4" Compress Bandages, unsterilized 2 7' lengths ¾" Pipe for improvised stretcher
- 4 Wood Blocks for heat applications 6 U. S. Bureau of Mines First Aid Manuals
- 2 Padlocks
- 1 Strong Steel Box, as illustrated

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MINE SAFETY APPLIANCES CO. OF CANADA, LTD.

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B.F.Goodrich



B. F. Goodrich belt resists fire, will not spread flames

THREE years ago, this Virginia coal company took a major step toward increased mine safety. They ordered B. F. Goodrich conveyor belts, made with a new fire-resisting rubber.

The B. F. Goodrich fire-resisting belt will not support combustion or spread fire. While it will smolder when exposed to open flame, it stops immediately when the fire is removed. B. F. Goodrich belts have been accepted for listing as fire resistant by The Bureau of Mines (Acceptance No. 28-6).

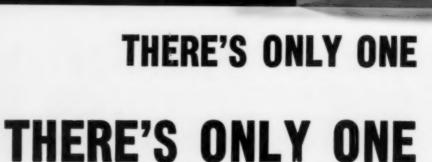
The special rubber used in these belts also has high resistance to impact, abrasion, oil, grease, tearing, cutting, gouging, and even mildew attack. As a result, B. F. Goodrich belts made with fire-resisting rubber can be expected to equal—or surpass—the long service records made by other B. F. Goodrich Caricoal belts in underground mines.

At the mine shown in the picture, the superintendent reported that the B. F. Goodrich fire-resisting belts show little or no wear.

Let your B. F. Goodrich distributor show you how longer-lasting Caricoal conveyor belts can cut your coal-handling costs, reduce maintenance costs, and if made with fire-resisting rubber, reduce the chance of fire in your underground mines. The B. F. Goodrich Company, Dept. M-620, Akron 18, Obio.

B.F. Goodrich

INDUSTRIAL PRODUCTS
DIVISION



THERE'S ONLY ONE

... AND HULBURT

Red Grease - the tough lubricant that STAYS PUT at hottest temperatures

Red Grease -water won't wash it away-pressure and shock won't affect it

Red Grease - which you use less often at less cost for longer lubrication

HULBURT OIL &

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For 40 Years Specialists

MONACO . . .

HULBURT Red Grease

MAKES IT!

Red Grease

. . . takes heaviest punishment

... cuts down on lubrication cost ... makes mining

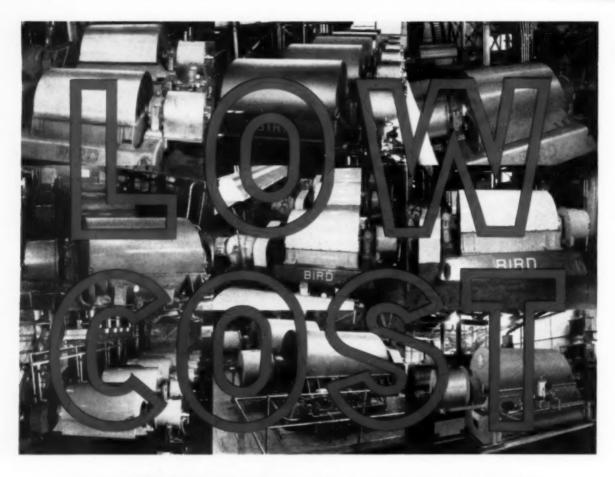
machines operate better and longer

GREASE COMPANY

PENNSYLVANIA

in Coal Mining Lubrication





DEWATERING OF FINE COAL

The Bird Coal Filter isn't the cheapest dewatering equipment you can buy.

But it delivers the dried coal at the lowest cost per ton. You're money ahead in the long run.

That's because operating and maintenance costs are so much lower than you get with ''low priced'' equipment. For example, one plant using a number of Birds runs them for better than 12 months without shutdowns for maintenance other than routine lubrication. During that time each Bird delivers over 200,000 tons of coal.

Whether your plant turns out 100 tons or less per hour or 2000 tons or more, the Bird Coal Filter offers you true economy.

Ask us to prove it for your plant.

BIRD MACHINE COMPANY . SOUTH WALPOLE, MASSACHUSETTS

Regional Offices: Evanston, III. • Portland, Oregon

BIRD COAL FILTERS



In this issue . . .

West Virginia's Amherst Coal Co. was faced with the problem of reaching reserves farther and farther away from its cleaning plant. On p. 54 you'll find out how Amherst's management went after those reserves (3,000 acres) and how they came up with new ideas in slope construction that were coupled with ideas for smooth, efficient overland transportation.

Once again, Keystone Coal Buyers Manual, a Coal Age affiliate, has rounded up a list of the nation's biggest 50 mines. A lot of jockeying has taken place since we last published a list a year ago. Maybe you'd like to compare your operation with the annual production tonnages of the biggest. If so it's all there on p. 67.

 And, if you turn the page to 68 you'll find an article that's a little off our format beat. It's all about your profession—how and where you live, work and relax in modern mining communities.

Coming in May . . .

 How 22 tons per man on the section are recovered from a seam with 50% reject is the theme of a deep-mining feature coming next month. You'll want to read how conventional equipment can be applied and maintained to achieve this productivity.

• From Illinois comes a story of the first U. S. application of the Dutch State Mines heavy-media process, telling how the specific gravity of the bath is maintained and how the medium is recirculated.

 Also coming next month: the latest in the Coal Age series on major markets. This time it's coal and steel.

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APRIL, 1956 NUMBER 4

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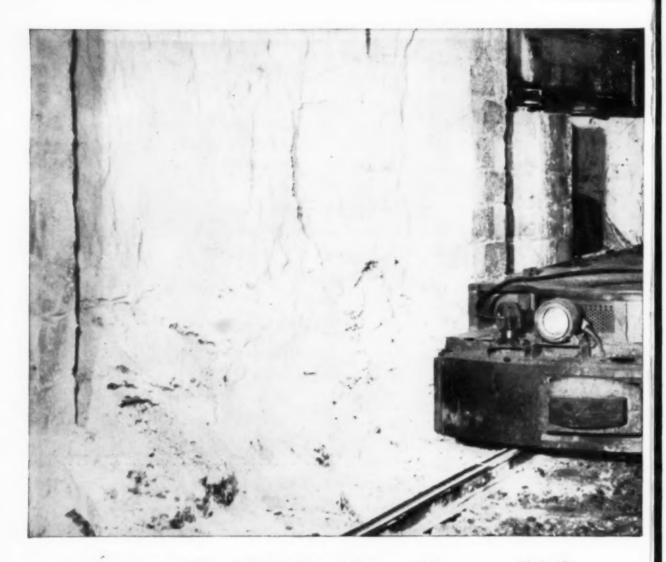
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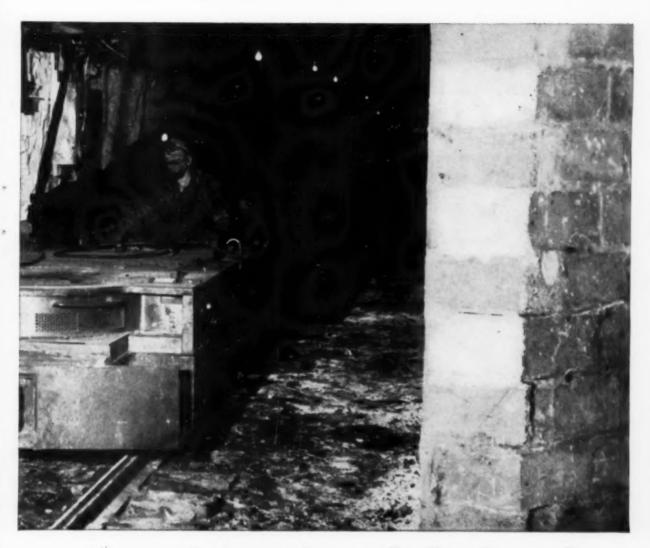
NOW, only one lubricant—Texaco Multifak—is all you need for the grease-lubricated anti-friction and sleeve-type bearings in locomotives, cutters, loaders, motors and other equipment. With this simplification, you'll save time, avoid lubrication errors, reduce lubricant inventory and lower maintenance costs.

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For big-scale performance



on all grading jobs

SEE THE SOLL SOLL BUY

Here's motor grader design that pays off in extra output on today's tougher, more precise jobs. You get these big advantages when you put the FORTY FIVE to work for you—more power at the wheels, more dirt at the blade, plus precision control and ease of operation.

Allis-Chalmers diesel engine with followthrough combustion provides real lugging ability ... responds quickly to varying load conditions ... has the power with tandem drive to pull through soft spots, roll big windrows, peel off that last inch of tough, hard dirt.

ROLL-AWAY moldboard reduces friction drag by rolling the load up and ahead of the blade edge...moves more dirt with less effort...makes more efficient use of engine power on sloping, rough grading, stripping and other heavy-duty construction and maintenance jobs. Toggle-type controls give the operator fingertip command of every blade position, every job. Exclusive mechanical toggle-type action provides a positive "feel," yet operation of moldboard components, scarifier and front wheel lean is accurate and easy.

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ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION MILWAUKEE 1, WISCONSIN



ALLIS-CHALMERS

ROLL-AWAY is an ALLIS-CHALMERS trademark

Forty Five

120 brake hp 23,800 lb

6 forward speeds to 20.6 mph

3 reverse speeds to 7.0 mph



Wire Rope at Work—This is a spot in the southeast coal fields, one where mighty mean digging conditions exist. Stripping is slowed by some frustrating sandrock formations. On this particular job, the big dragline excavator, with a capacity of 16 yd, was using only a 10½-yd bucket. That's how tough the digging had become.

A thick layer of overburden covered the coal. Rock or no rock, the overburden had to go. And go it did—with stout Bethlehem rope pulling and hoisting the bucket. This rugged wire rope was of course Purple Strand, Bethlehem's top grade. There was Purple Strand, too, on the shovel in the foreground. The ropes had been chosen with particular care, and even in the roughest kind of going, they easily weathered every stress.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Betblebem rope for the following industries and numerous others:

MINING • QUARRYING • CONSTRUCTION • EXCAVATING • PETROLEUM • LOGGING • MANUFACTURING



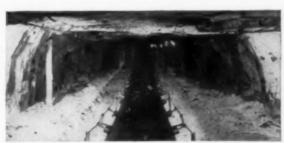


The most useful conveyor you can buy... GOODMAN Rope Belt CONVEYOR

Here's a conveyor that's practical anywhere in the mine for any type of service. Use it for light duty with carrying idlers and supports widely spaced, or for heavy duty with idlers and supports closer together. No other changes required. This one conveyor does it all . . . does it better . . . and at lower cost. It's the most useful conveyor you can buy.

Low installation, extension and moving costs:

Wire rope with lightweight supporting stands and chain-linked idler assemblies replace heavy, rigid structural framing and fixed idler brackets. Handling has been so simplified as to permit a 150 foot extension of the Rope Belt in less than one hour—between shifts—with no loss in production time.



Rope Belt Conveyor is easily extended to keep pace with advance of working face.

Superior load-carrying ability:

Hinged action of linked idlers and spring action of the rope cups the belt to the load, prevents shifting when passing over idlers.

Low maintenance:

Rope alignment is assured between anchor points. Linked idlers keep belt trained. Spillage is negligible; there is no structural assembly to aid build-up of material to foul idlers or bearings. Impact damage to belt at idlers is greatly reduced; life of idler bearings is extended. Fewer idlers are usually needed in the line.

You can cut operating costs with the new Goodman Rope Belt Conveyor. You can reduce down-time, too, and greatly increase productivity. Get the facts. Write for our new catalog. There's no obligation.

GOODMA/

MANUFACTURING COMPANY Halsted Street and 48th Place, Chicago 9, Illinois

CUTTING MACHINES . CONVEYORS . LOADERS SHUTTLE CARS . LOCOMOTIVES . CONTINUOUS MINERS

Use Genuine Goodman Replacement Parts

CUT MINING COSTS WITH HEAVY - RUGGED - POWERFUL McCarthy AUGER DRILLS





VERTICAL MODEL 106-24

World's Fastest Heavy-Duty Vertical Auger Drill

Bores faster, deeper, larger dia. holes than any other auger drill. New gear reduction unit slows auger rotation for operation in hard rock formations. Drills 8* and 9* dia. holes readily in shale and sandstone formations, drills larger dia. holes up to [24* dia. in softer formations.

Write for Bulletin M-100

FINGER-TIP CONTROL



Gives Desired Retating Speed Of Auger

HYDRAULIC FEED



Provides Any Speed Up To 6 Feet Per Minute Horizontal Feed Of Drill

COAL RECOVERY

"Walks" from hale to hale to auger high-quality Bonus Coal

An Ohio miner removes 300 tons of coal in each 6 1/2-hour working day with this Model 14 36-42 x 12' McCarthy drill, operated by two men. He drills 42' dia holes 144' deep. Auxiliary conveyor eliminates spillage at hole. It operates on either side of drill for working blind cut. Twelve different models of McCarthy Coal Recovery Drills mine low-cost "bonus coal."

Write for Bulletin M-101 and M-102



HORIZONTAL MODEL 104

Lowest Drilling Costs per foot, Self-Propelled or Truck-Mounted

Bores up to 12° dia. holes to 150° depth faster, cheaper than any other horizontal drill. Requires less working space, saves many man-hours. . . operates easily in tight, hard-to-reach locations.

Write for Bulletin M-105

THE SALEM TOOL COMPANY

SALEM, OHIO, U. S. A.



One rubber-tired tractor handles 90% of coal used by Wisconsin mill

Unit dozes coal, self-loads scraper, runs all around 80-acre plant area to handle emergency jobs

To keep ahead of heavy coal demands, Thilmany Pulp and Paper Co., Kaukauna, Wisconsin, uses their high-speed, rubber-tired Tournatractor 7 days a week for coal stockpiling and feeding of hopper. The rubber-tired rig handles about 90% of the 35,000-ton annual coal requirement.

Coal shipped to mill on barges

In typical operation, all coal is shipped 20 miles by barge from Green Bay, Wisconsin. Unloading is done by cranes at the company docks. From docks, coal is dozed by the Tournatractor to stockpile 800 feet away. Unit dozes 400 tons in less than a day. Bulk of coal is brought in this way, although some comes by rail and is unloaded directly from cars into grizzly.

Tractor-scraper team fills daily coal needs

Besides these dozing operations around dock and stockpile, Tournatractor teams up with 14-yd. scraper to self-load, haul, and dump coal into grizzly, as shown in photo. In 12 trips, on 1000' cycle, rubber-tired



208 hp Tournatractor moves quickly up 5% grade...completes 400-ft, push in 40 seconds.



team fills daily requirement of 2 silos which hold 125 tons of coal. "We put up 100 to 125 tons every morning," says Operator Oscar Patschke.

Reduces fire hazards

With tons of coal constantly arriving at docks, Tournatractor was selected to maintain the stockpile for two reasons:

- Excellent compaction by two-footwide tires reduces possibility of spontaneous combustion;
- Tractor-on-rubber runs at 19 mph instead of crawling at 5 to 8 mph.

Ideal utility tool

When stockpiling assignments are done, this 19 mph rig has also proved ideal for odd jobs. On Thilmany's 80 acre tract, unit is ready at a moment's notice to handle clean-up work, scattered bulldozing assignments, and cinder spreading.

When self-powered cranes jump tracks, Tournatractor is there immediately to put unit back on rails. Rig does all switching of coal cars, too. "It can push as many as 8 or 10 loaded cars at once, with no trouble," says Operator Patschke.

96% efficient after 3300 hours

After 2 years and 3300 operating hours, Tournatractor is operating at 96% mechanical efficiency. Operator Patschke reports, "I work 6½ hours out of a 7 hour shift so I can fuel up and do my servicing."

Rubber tires help compaction

"Because of the rubber tires on this machine, we get less crushing of coal," says yard foreman Norman Boettcher. He added, "It packs coal better than crawlers, too."

Whether stockpiling or handling scattered maintenance and construction jobs, you'll be amazed at Tournatractor's ability to get more work done at less cost per man-hour, all year around. Call us today for a demonstration on your next job.

Tournatractor-Trademark Reg. U.S. Pat. Off, T-850-CH-b



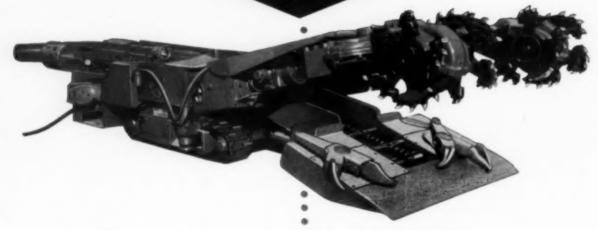
LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

important REASONS why you should choose the

Lee-Morse MINER



- The Lee-Norse Miner cuts and loads coal at a rate of 2 to 3 tons per minute.
- The Lee-Norse Miner is the only machine that cuts continuously a "DIAMOND PATTERN" in the face of the coal. This new and unique method of cutting coal produces "Coarse Cuttings" and less fines.
- 3. The Lee-Norse Miner is built like a modern Coal Loading Machine with improved "DUAL" gathering arms and flexible conveyor and with the exclusive Lee-Norse Cutter Head, which cuts from the roof down to the floor and gathers all the coal as it is cut.
- The Lee-Norse Miner operates with the same electric power, now provided for conventional mechanical mining—No need for larger power facilities.

- The Lee-Norse Miner, built like a flexible, mobile loader, has excellent clean-up... no need for auxiliary loading machine.
- The Lee-Norse Miner is designed for easy maintenance. All gear drives, electric motors and hydraulic pump and motors are located on the outside, where they can be attended to quickly. No swinging head or turntable -no chain drive-makes for less maintenance.
- The Lee-Norse Miner has "Low Bit Cost" due to the solid mounting of cutter bits and unique method of cutting coal.
- 8. The Lee-Norse Miner is well proportioned in size and weight to suit present day mining conditions. With simple control and high tramming speed it operates and moves like a modern mobile loader and not like a semistationary miner.

Write today for literature:

Lee-Norse Company

Specialists in Coal Mining Equipment



If you are interested in cutting cycle time on your hauling, consider Tournapull Rear-Dumps.

These units make a non-stop Uturn by power steer in less than their own length. They eliminate time normally wasted shuttling back and forth to turn in narrow quarters. They also frequently eliminate skid-plates or expense involved in construction of special turnaround areas.

Where space is unlimited, 90° turnability still gives you faster cycles. At the shovel, fast-maneuvering Tournapull Rear-Dump swings in and positions quickly. Loading unit need not sit idle while hauler operator wastes time on a wide sweeping turn and then a long, slow

back-in. Quick, safe spotting saves additional time on the dump.

Simplicity reduces maintenance

A great deal of the expense involved in maintenance is also eliminated because of the simplicity of the Tournapull turn mechanism. Steering involves only an electric motor connected to a ring gear and kingpin shaft. A flick of the finger activates the motor and causes primemover to pivot up to 90° around trailing unit. Turns are made quickly regardless of footing. There are no front steering knuckles, no reach rods, no complicated mechanisms to get out of line, maintain, or repair.

Now available with optional tailgate.

Check these and all the other advantages of Tournapull Rear-Dumps. See for yourself how they speed cycles and cut costs, Write or call any time for owner-verified production studies and specifications. There's no obligation,

Overall Width reg'd, non-stop 180° turn Model Capacity HP Travel position | Dump position Length D 138 25'2" 11 tons 24'8" 19'2" C 22 tons 208 30 28'8" 20'8" 35 tons 37'3"

Tournapull Rear-Dump's short-turn radius saved construction of expensive turn-arounds in this 26' wide, 165' deep railroad cut. With body raised, as shown, "C" easily made non-stop U-turns within the narrow area.

These features, too, can help on your job

Hauls anywhere — Big single lowpressure tires let Rear-Dumps safely travel narrow haul roads, paved highways, city streets . . . haul cross-country over roughest terrain, through muck and soft fills.

Reduces maintenance — Because these Rear-Dumps have no jack lines, no long drive-shaft, no frame, subframe, springs or tie rods, most common troubles of conventional reardump haulers are eliminated.

Dumps fast, clean — Flick of switch activates hoist motor. Body lifts quickly to any desired angle for spreading on run. At full dump position, bowlip is behind rear wheels so dump can be made clean over bank. Streamlined body sheds material readily.

Cuts weather delays — Power-transfer differential automatically applies power to drive wheel on firmest footing... pulls unit through mud, sand, soft materials which stop ordinary haulers. It's a Tournapull exclusive.

Resists body shock, damage — Three-layer, all-steel, grid-type bowl with tool-steel floor resists loading shocks. Big, wide bowl opening is easy target for any loading unit.

Improves safety — Multi-disc air brakes have more braking surface on one wheel than most haulers have on all 4. Low center of gravity, good visibility, front-wheel drive, easy control all contribute to maximum safety.

Delivers full power — Torque converter (optional in C size) automatically balances load and torque so you get full horsepower always. Lugging is reduced; shocks in transmission and final drive virtually eliminated.

Reduces fatigue — Big low-pressure tires and air-foam cushion seat smooth out ride for operator. Electric push-buttons control power steer and 2-way power dump. Eliminated is all manual work of fighting balky levers.

Insures future earnings — Behind Tournapull prime-mover, you can interchange rear-dump with scraper, bottom-dump, crane, flathed. These trailing units lower your investment, let you handle any future job efficiently, help you keep your Tournapull profitably busy the year-around.

Tournapull—Trademark Reg. U.S. Fat. Off. R-792-G-b

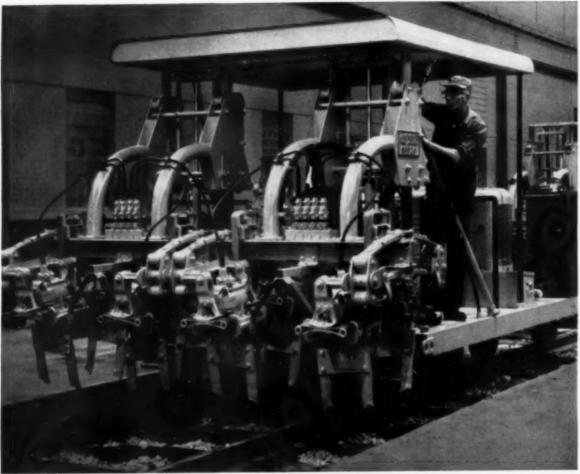


LeTourneau-WESTINGHOUSE Company

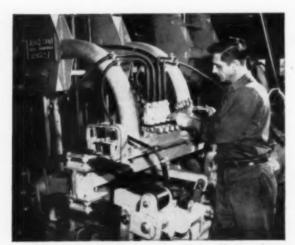
Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

"Tiger Brand Amerclad is the most



The completely self-contained Jackson Track Maintainer.



Tightening connectors. Machine delivers 4500, 2-ton blows per minute.



Assembling leads. Each vibrator delivers 1/4 ton blow.

durable cable we've ever used"

says ELECTRIC TAMPER & EQUIPMENT CO., Ludington, Michigan

ANY years ago, the executives at Electric Tamper & Equipment Co. found out that when railroads order a piece of machinery, they expect it to last a long time-without breakdowns. Since then, Electric Tamper has won a high place in industry by producing a line of the hardest-working, toughest track maintenance machines on the market.

Leader of the line is the Jackson Track Maintainer, used for tamping ties. It has 8 powerful vibratory motors that drive 8 tamping assemblies. Each motor is powered with Tiger

Brand Amerclad cable. The vibration and flexing (which are very severe) caused previous cable to crack until the jackets actually peeled away from the conductors. So they asked American Steel & Wire for advice.

Tiger Brand Amerclad was the solution. Finely stranded conductors soak up vibration and allow greater

flexibility than ever before. The tough, well-cured jackets are impervious to oil, grease and the burning

In the company's own words, "Tiger Brand cable is certainly superior to anything we have ever seen for this class of service. Its complete dependability under all service conditions has definitely helped us to maintain our good reputation in the

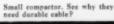
Do you want a better electrical cable-engineered for your equipment? Just call your American Steel & Wire representative.



The Jackson Multiple Compactor for consolidation of granular soil.









AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL, GENERAL OFFICES: CLEVELAND, OHIO

Hand Vibrospade. Cable usually drags on the ground.

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS . TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS UNITED STATES STEEL EXPORT COMPANY NEW YORK

USS TIGER BRAND ELECTRICAL WIRE & CABLE



A STANDARD TIGER BRAND CABLE FOR EVERY SPECIAL JOB

- machine tool and building
- special purpose wire and cable
- asbestos wire and cable
- · paper and varnished cambric cable
- aerial, underground and submarine cable
- · shovel and dredge cable
- · mold cured portable cord



STATES STEEL UNITED



Powered by General Electric system . . .

World's biggest shovel removes 90-foot overburden

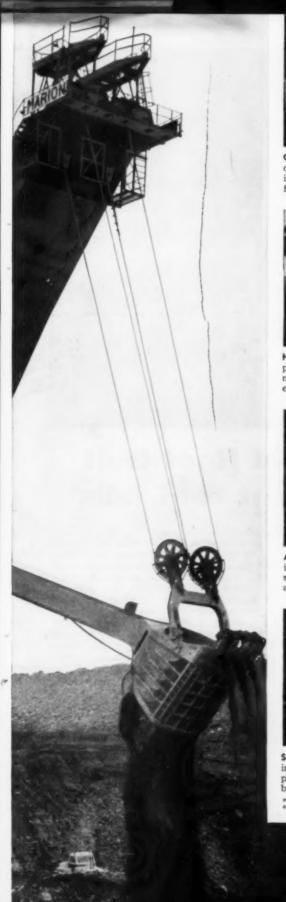
60-cu yd. Marion shovel permits profitable coal recovery by Hanna at a 20:1 ratio of overburden to seam depth

Speeding production for Hanna Coal Co., Division of Pittsburgh Consolidation Coal Co., The Mountaineer now makes possible profitable strip mining of coal from 4½-foot seams under an average 90 feet of overburden. A product of Marion Power Shovel Co., the machine is designed for dependable, round-the-clock, 45-second duty-cycle operation.

Among the highlights of its specially engineered electrical system, designed and equipped by General Electric, are: 14 main G-E motors with total rating of 7500 hp, but actually capable of producing twice that amount—including the largest d-c mill motors ever built; 6.9-kv distribution voltage—a new high for power shovels; and amplistat**-controlled performance.

In any phase of mining, G-E engineering and equipment can combine to help you increase production. For information, call your G-E Apparatus Sales Office, or write General Electric Co., Section 660-34, Schenectady 5, N.Y.







G-E ANALOG COMPUTER, enabled engineers of Hanna, Marion, and G.E. to complete in two weeks calculations on design and performance that might have taken three years.



4 RUGGED G-E vertical armored d-c motors, developing 1900 hp, give top performance on high-capacity, heavy-duty swing-motion.



HIGH DEPENDABILITY on a demanding application is provided by four G-E d-c mill motors developing 5000 hp for hoist-motion, equipped with Tri-Clad '55'† blower motors.



SHOCK-RESISTANT G-E armored motors, atop frame, power crowdmotion. Sturdy design helps assure long life on rugged duty.



ABUNDANT DC POWER for operating needs is supplied by two large G-E motor-generator sets. Synchronous motors drive seven generators, which develop 6000-kw peak output.



FINGER-TIP CONTROL of operating functions is provided by adjustable-voltage system with responsive G-E Amplidynes*.



SPEED CONTROL with protection from heavy impact loads during repeated bucket loading, plus simple one-man operation is provided by reliable G-E amplistat control panel.

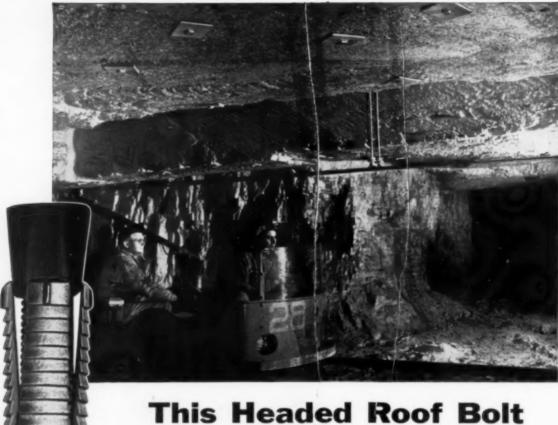


PROPELLING SHOVEL, four 250hp G-E wound-rotor motors, powering 8 crawlers, are controlled at second operator station. tReg. trade-mark of General Electric Company.

Engineered Electrical Systems for the Mining Industry



GENERAL (%) ELECTRIC



This Headed Roof Bolt helps prevent roof falls

Roof falls, resulting in injury and loss of production, are less likely when you use roof bolting, with Bethlehem's squarehead roof bolt. This method of roof support promotes safety because it anchors overlying rock. What's more, roof bolting offers these other worthwhile advantages: (1) improved ventilation, due to the absence of bulky supports, (2) increased production through greater freedom in operating mechanized equipment, and (3) less need for storage space, both above and below ground.

Used with Expansion Shell

The Bethlehem square-head roof bolt owes its positive locking action to the leaf-type malleable-iron shell with which it is used. When the bolt is tightened, the leaves of the shell expand, providing a firm four-way grip against the sides of the hole. A square roof plate provides additional support. A hardened washer, furnished with the assembly, reduces friction between the bolt head and roof-plate.

Bethlehem also manufactures a 1-in-diam slotted roof bolt, used with a steel wedge. This bolt, because of its larger diameter, is ideal where maximum strength is required. It is also suitable for pillar bolting. When installed, the wedge is driven into the 6-in. forged slot, spreading the bolt-ends to fill the hole.

If you would like to consider a roofbolting program, we suggest you would find it worthwhile to talk with a Bethlehem representative. Just get in touch with our nearest sales office.

	TYPICAL		
TYPE	DIAM	BREAK LOAD, LI	
Carbon	3/4 in.	24,000	
High-Strength	5/8 in.	24,000	
High-Strength	% in.	45,000	

BETHLEHEM STEEL COMPANY BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem
Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL



Bonus Powered too!

INTERNATIONAL





Corumetaffic Engine Clutch Facings Eave power, dery heat, proleag life! Uncomplicated, familiar-to-all engine clutch design of these new crawlers have power-holding, heat-defying, long-lesting Cerametallic focings. These facings reduce lever-pull up to 50%, provide amazing heat immunity, add service freedom, cut upksep!



New ... 500-hour lube intervals with new matel-to-metal, track roller seals! You save the time and expense of frequent inspections or lubrications, with the new full-floating, cartridge-type, track roller seals provided on the TD-24, TD-18, and TD-14. These precision-lapped, metal-to-metal seals are so effective they give you safe 500-hour intervals between roller lubricational

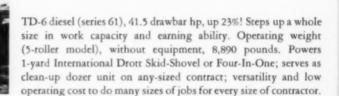


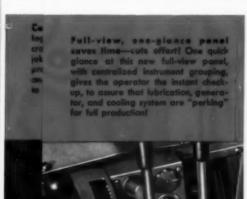
Steps up a size... in job range and capacity!

50 Net Engine Horsepower. In International Drott Machines, Engine develops 55 Net Horsepower.

61 Series







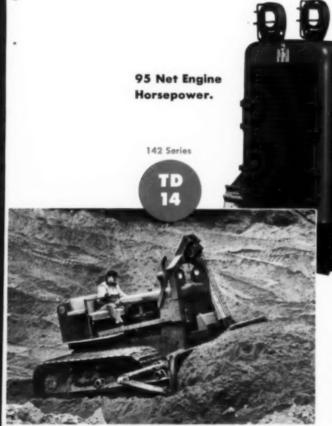
New Feld-ever Seet Aids Fest, Controllized Servicing! New fold-over seat of the TD-6 and TD-9 models allows operator to give you the time and convenience advantages of centrollized steering clutch assembly servicing. Lubricant fittings are conveniently grouped and fully accessible!



Thereugh air filtretien assured by new under hood cleaner! Instead of being "in your lap," or a knee-bumping obstruction, oir cleaners of the new International crawlers are side-mounted—for easy accessibility, yet out of the way. They have big capacity and high efficiency, too, for positive air filtration!



International Grawlers graphics new design to speed y

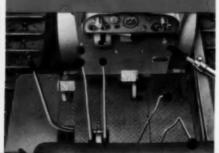


TD-14 (series 142), 78.5 drawbar hp; weighs 21,095 pounds (without equipment). Features "new look" engineering, job-speeding visibility, new equipment-carrying and operating strength. All-weather electric starting, standard equipment. It's a fast, responsive, big-capacity dozing tractor. Powers 2½ cu. yd. International Drott Skid-Shovel or Four-In-One; 15-ton capacity Superior Pipe-Boom; other similar-sized equipment.

Control Towar Visibility adds specifing officiency! See how new interactional crowlers are streamlined for complete job-control visibility. Seat is amply high to provide full view of equipment, terrain, and variations requiring operator action, to maintain officiency.



Clean, selv deck cleaned for actional Look down on that safe, clean, flush deck —a platform for full production. The wide, man-size seat is fully-adjustable; from rubber padded. Instruments centralized for one-glance check-up! Even a cigarette lighter is provided, to prevent needless stops!



Pressurized Clased Cooking System for Positive Parformance Protection! New pressurized cooling systems provide fast warm-up under thermostatic control—and positive ideal temperature control with forced circulation through full-length jackets. That aids clean combustion, guards oil film strength, protects performance. Radiator core assembly is easily-removable, without disturbing radiator guards.



give you Bonus horsepoweryour jobs, control your costs!

66 Net Engine Horsepower. In International Drott Machines, Engine develops 71 Net Horsepower.

91 Series

TD 9



TD-9 diesel, (series 91), delivers 54.5 drawbar hp—up 32%. Operating weight (5-roller model), without equipment, 12,000 pounds. Now up in a new heavy-duty job range. New power is backed by new power train and track frame strength, new operating and servicing ease. Powers International Drott 1½ cu. yd. Skid-Shovel and other equipment requiring similar power.

480 hr. full-flew luke all filters guard bearings, cut upkeept Every drop of oil on its way to lubricate moving engine parts must pass through these new abrasive-trapping micron-type filters—with the capacity, strength, and efficiency to give 480 hours of wear-fighting, upkeepcutting duty!

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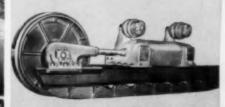
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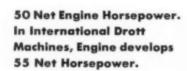
Aydraulte Fower Steering Inspires Operater Geoperation! New hydraulic power steering of the TD-14 and TD-18 cuts operator fatigue—and along with the other big effort-saving advantages, makes it easier than ever to deliver full-capacity production! TD-6 and TD-9 have spring boosters to lighten the operator's job.



"Bridge-streng" track frames for "siem-beng" conditions! You are looking at the strongest track frame in the industry for crawlers of TD-18 and TD-18 size! Heavy steel box-section beams, weld-joined to heavy stress-relieved steel plates—and rigidly gusset-braced—they're your foundations for record-melting "rough-and-tumble" performance!



Steps up a size... in job range and capacity!



61 Series



TD-6 diesel (series 61), 41.5 drawbar hp, up 23%! Steps up a whole size in work capacity and earning ability. Operating weight (5-roller model), without equipment, 8,890 pounds. Powers 1-yard International Drott Skid-Shovel or Four-In-One; serves as clean-up dozer unit on any-sized contract; versatility and low operating cost to do many sizes of jobs for every size of contractor.

Full-view, one-gleace penel
seves time—cuts effort! One quick
glance at this new full-view panel,
with centralized instrument grouping,
gives the operator the instant checkup, to assure that lubrication, generator, and cooling system are "perking"
for full production!

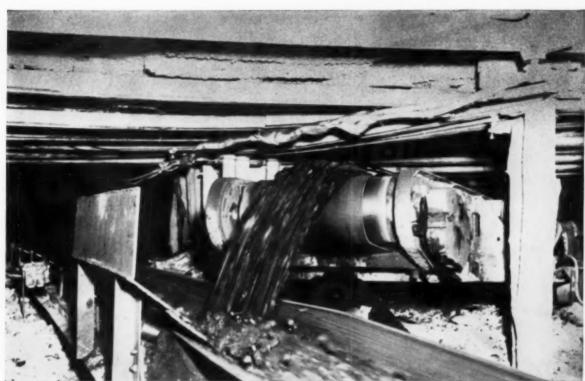


New Fold-ever Sect Aids Fest, Centralized Servicing! New fold-over seat of the TD-6 and TD-9 models allows operator to give you the time and convenience advantages of centralized steering clutch assembly servicing. Lubricant fittings are conveniently grouped and fully accessibles



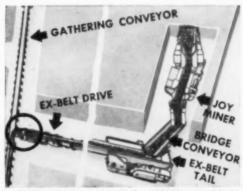
Thereugh air filtration assered by new under-heed cleener! Instead of being "in your lap," or a knee-bumping obstruction, air cleaners of the new International crawlers are side-mounted—for easy accessibility, yet out of the way. They have big capacity and high efficiency, too, for positive air filtration!





EXTENSIBLE BILT CONVEYOR discharges coal onto gathering conveyor for trip to preparation plant (See diagram below). Labor-saving system depends on neoprene for belts that give long wear... retard flame,

Rugged <u>neoprene</u> <u>belts</u> give long service in continuous haulage systems



 Continuous system starts at the Joy 1-CM Miner which loads on the Bridge Conveyor and then to the Joy "Ex-Belt" Conveyor. The Extensible Belt Conveyor will extend up to 1,000 feet.

Higher production at a low cost is the big advantage of the new Joy Extensible Belt Conveyor combined with the Joy 1-CM Continuous Miner. Such a system makes continuous haulage from the mining face a practical, economical operation.

The tough, abrasion-resistant neoprene belt provides a steady stream of coal from face to gathering belt. Lightweight and flexible, the Ex-Belt conveyor can be quickly lengthened by adding 100-ft. lengths of belting, and setting up additional conveyor stands as the mining advances.

Neoprene belting was chosen for this system principally because of its flame retardance. In addition, neoprene's resistance to abrasion, tearing and chipping assures long service life, minimum maintenance for the belts.

It will pay you to specify belts with covers made of neoprene, Du Pont's synthetic rubber, just as it has paid you to specify neoprene jacketing for all of your mine trailing cable.

NEOPRENE

The rubber made by Du Pont since 1932



Better Things for Better Living . . . through Chemistry

FREE! THE NEOPRENE NOTEBOOK

Every issue contains new illustrated case histories, interesting articles, new ways to save with neoprene. Mail this coupon today to E. I. du Pont de Nemours & Co. (Inc.), Elastomers Division CO-4, Wilmington 98. Delaware.

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NOW...THE JEFFREY SHUTTLE CAR

Check these TOP-VALUE features of the Jeffrey Class 90 Shuttle Car! MAKES MORE ROUND TRIPS Even when fully loaded, the "90" trams at an average of more than 4 MPH. Two powerful

LOADS RAPIDLY

Those big loads that pay off at the tipple can those one toates that pay on at the tipple can be loaded fast on the "90". Conveyor operating speed is 50 feet per minute. Chains and flights are the same as used in heavier duty shuttle cars . . . hold up longer. They are the highest quality, produced in Jeffrey's own chain shop. End of car is especially designed to fit easily under booms on loaders or surge cars, for maximum production coordination between face units and main transportation.

VCARRIES HEAVY LOADS

Up to 8 tons can be loaded on this sturdy car. No need to worry about overloading. The "90" has the axles and wheel units originally calculated for much heavier duty on the fieldproven heavy-duty Class 67 car. You have this extra capacity for all loads-coal or rock.

Jeffrey 10 HP motors operate through fourwheel drive for maximum traction and speedy tramming. Has progressive series-parallel traction control with hand-selective series position. DISCHARGES QUICKLY Less than one minute is required to completely

unload the "90". Variable speed hydraulic drive on the discharge conveyor facilitates unloading to belt conveyors or mine cars at a uniform rate -in the least time, with a minimum of spillage. Hydraulic elevating discharge conveyor is standard and available in lengths of 45", 52" or 57". Jammed lumps are never a problem, can be cleared instantly by reversing conveyor.

VOPERATES EASILY Operators everywhere are enthusiastic about the maneuverability of Jeffrey shuttle cars. The drive is positive-employs a no-slip differential between wheels on the same axle. Steering is exceptionally easy. Four-wheel power steering and four-wheel disc-type hydraulic brakes, plus conveniently placed steering and brake controls, minimize operator fatigue and help boost tonnage,



INQUIRE TODAY ABOUT THIS IMPRESSIVE VALUE





TOP VALUE FOR ...

- . Heavy duty service
- Low first cost
- Low operating cost

Here is Jeffrey's latest contribution to the shuttle car field . . . the low-cost heavy-duty Class 90 unit!

The Jeffrey Class 90 car provides all the essential features of the Class 67 Car ... the industry's leader for big payloads, speedy tramming and easy maneuverability... features that mean low operating cost.

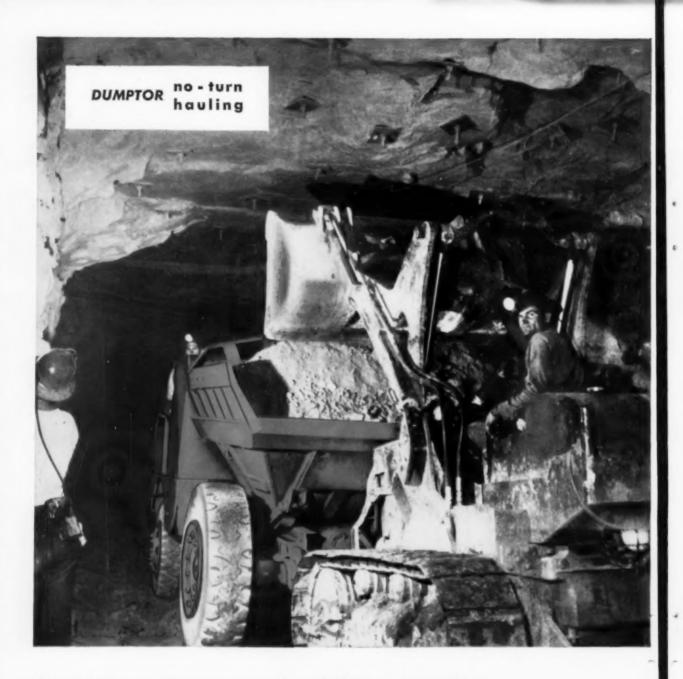
Before you buy any shuttle car, it will pay you to investigate this important Jeffrey value! Call our nearest office.

THE
JEFFREY MANUFACTURING COMPANY
COLUMBUS 16, OHIO

The Class 90 shuttle car is available in 44" and 50" basic heights, with 4", 6" or 8" side-boards. Payload of 8 tons can be trammed at more than 4 MPH average. Powered by two 10 HP traction motors. Sturdy frame and body. Heavy duty wheel units and large diameter tires.



MINING • CONVEYING • PROCESSING EQUIPMENT
TRANSMISSION MACHINERY • CONTRACT MANUFACTURING



Shuttles underground without turning

There's no room to turn in this mine tunnel—and no need to turn. Koehring Dumptor drives up to the tractor-shovel, body forward, gets its load—and then shuttles back out of the tunnel at the same speed as it entered. Dumptor operates with equal ease in either direction. It gets this no-turn operating advantage through a constant-mesh transmission that gives the same 3-speed travel forward and reverse. Dumptor no-turn hauling has gained wide acceptance in both underground and strip mining, as shown on these pages. It solves problems of operating along overhead trestles, on open-pit ledges,

narrow haul roads — is especially practical for stockpiling. There's an important production advantage, too. Every turn eliminated cuts 15 seconds off cycle time. This adds up to a substantial increase in yards or tons hauled per hour. For example — by saving only 2 turns on a round trip, time studies prove that Dumptor often increases hourly yardage output more than 10% on an average 1000-foot haul. Better have your Koehring distributor show you what Dumptor no-turn hauling can mean on your mine, quarry or stockpile operations. He has some facts and figures that will interest you. Call today.



Elevated haul-way — On extensive stockpile operation, Koehring 6-yard Dumptor shuttles along overhead trestle. It travels from mine headshaft to edge of stockpile, dumps, and returns for next load — never turns. This trackless method replaced lorry cars at several mines. Some Dumptor owners set up access ramps, instead of using trestle systems.



Dumps in one second — Dumping off end of hillside trestle, operator drives up to hopper, trips the body-release lever, and gravity dumps the 6-yard load instantly. One second later, Dumptor is on its way back. There is no 15 to 25-second wait for slow-acting body hoists. Koehring gravity-dump works every time — never balks, and never wears out.



Big production team — Working with Koehring 1½-yard shovel, Koehring Dumptors are loaded with body forward, ready to travel and dump without turning. These heavy-duty haulers have better than 6 h.p. for every ton of loaded weight — accelerate fast, pull through soft ground, up grades and ramps with less shifting — climb 24% grades fully loaded.



Stockpile specialist — Dumptor puts stockpiling on a fast shuttle-haul basis — eliminates turning at the loader and on top of the pile. Notice how instant dumping action kicks the load out over edge of pile — saves a lot of dozer clean-up. Free-swinging kick-out pan breaks load suction in wet materials, bolts down to floor when handling rock.



REPUBLIC HELPS YOU 2 WAYS



ACTUAL EXPERIENCE WITH ROOF BOLTING is the foundation for design of Republic's full line of Mine Roof Bolts. Most versatile types are the exclusive forged wedge head bolt and the square head bolt with wedge nut and

forged rigid expansion shell shown in inset above. All types are backed by a century of fastener manufacturing know-how, plus a strict quality-control program extending from raw ore to finished product.

REPUBLIC



World's Widest Range of Standard Steels

IN SOLVING ROOF BOLTING PROBLEMS

Maximum security of your bolted mine roof depends on two main factors:

1. Selection of the proper roof bolt

2. Proper location and placement of bolts

Republic is the only Mine Roof Bolt supplier in a position to help you determine the best answer to both parts of this problem.

In the first place, Republic alone manufactures all four major types of mine roof bolt assemblies. These include the slotted mine roof bolt; the conventional bolt and expansion sleeve shell; the square head bolt with wedge nut and rigid expansion shell; and the forged wedge head bolt with rigid expansion shell. Investigation of overhead strata, headroom and method of placement are necessary to select the most suitable type or types for a given mine. Here, again, Republic can give you valuable

Based on extensive operating experience gained in its own and other coal and ore mines throughout the United States, Republic has amassed a wealth of data on successful mine roof bolt application. As a result, our Bolt and Chain Division can, on request, send a specialist to your mine to conduct thorough tests and impartially recommend the proper type of bolt and installation procedure.

It will pay you to make Republic a part of your team in promoting safer and more efficient roof bolting throughout your mine. Simply contact your local Republic Office or mail the coupon today.



WATER-HANDLING PROBLEMS in this mine were solved by installation of Republic's four-inch flexible plastic pipe. Prior to this installation, original piping was destroyed within six weeks by an acid water condition. The plastic pipe shown has been in service 18 months and is still in excellent condition. For complete information, mall coupon.



CLEANING PLANT CLASSIFIER PROBLEM was solved by installing a solid ENDURO® Stainless Steel bottom. In operation, the unit is subjected to extreme obrasion and scouring by the slurry mixture of coal, waste and water pumped from the revolving arms. Because it resists abrasion and pitting, ENDURO has proved best for long-term economy.



PROTECTION AGAINST SEVERE CORRO-SION PROBLEMS of electrical condu is provided by Republic Dekoron®-Coated ELECTRUNITE® E.M.T. This versatile electrical raceway gives your circuits the dual protection of its extruded polyethylene plastic armor against fumes, gases and vapors plus the mechanical strength of steel. When properly installed, long-lasting protection is assured from outlet to outlet. Send coupon for details.

STEEL

and Steel Products

REPUBLIC STEEL CORPORATION Dept. C-1700 3124 East 45th Street, Cleveland 27, Ohio

Please send me complete information on:

- ☐ Mine Roof Bolts ☐ Stainless Steel ☐ Plastic Pipe ☐ Dekoron-Coated E.M.T.

Company_

Address

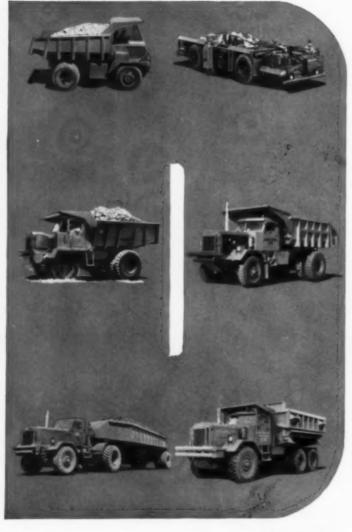
SINCE 1903 ... A PIONEER IN

10 Ton to 55 Ton Capacity

MODEL 10-S — 10 ton end dump truck, powered by 150 M.P. Diesel Engine. 13,000 front axie with 1714" x 3" air brakes. 26,000 full full floating double reduction rear axie with 161½" x 7" air brakes. 12.00 x 20, 16 piy rock lug tires all around. Hydraulic steering. Approximate weight with body and hoist, 20,000 fr.

MODEL 20-S — 20 ten end dump track powered by 22-75 H.P. Diesei Engine 20,000 front axie with 1744 x 4" air brakes and 70,000 full floating planetary rear axie with 20 x 9" air brakes. 14,00 x 24, 20 ply rock lug tires front, 16.00 x 25, 24 ply rear. Hydraulic steering. 5 speed transmission or torque converter with 4 speed transmission. Approximate weight with body and holst, 35,000 ft.

MODEL 50-S-BDT — 60 cubic yard bottom dump coal hauter. 300 H.P. Diesel Engine, Allison converter and 3 speed transmission, or optional Twin Disc converter and 4 speed transmission. Trailer axle, 85,000 capacity, 20 x 9 air brakes, hydraulic dump, Approximate weight, 68,000 c.



MODEL 18-S-UG-S—18 ton underground truck powered by 200-300 H.P. Diesel Engine with torque converter and fully reversible transmission. Hydraulic motor operates steel apron conveyor. Equipped with exhaust scrubber. Hydraulic steering. Operates as shuttle car. Height, 60°; width, 11°-0°; length, 28°. Approximate weight, 43,3002°.

MODEL 25-SL — 25 ton end dump truck, powered by 300 H.P. Diesel Engine. D-75-S rear axle, 100,000 capacity. FUSOO front axle, 25,000 capacity. 20 x 9" air brakes. Torque converters optional. Hydraulic steering. 14.00 x 24 front tires, 18.00 x 25, rear tires. Approximate weight, 48,000 with body and holst.

MODEL 35-T — 35 ton side or end dump truck, powered by 300-400 M.P. Diesel Engine, 25,000 tront axie with 16.00 x 25 tires all around. 200,000 tandem full floating rear axie. Torque converters optional. Hydraulic steering. Approximate weight, 70,000 with body and holst.

D-115

Kansas City 8.



ependability

How TIREX reduces shuttle car cable failures

Semicircular ridges, integral parts of the conductor insulation, grip the jacket tighter than conventional round conductors ever could. This greater gripping ability prevents insulated conductors from moving inside the jacket. Stopping conductor movement within the sheath stops cable failure from conductors twisting, bending and pulling.

An open braid applied over the ridges locks the insulation and jacket together. It works this way: As Selenium Neoprene Armor is extruded over the insulated conductors, it flows around the braid between the ribs. The ridges increase surface area of the insulation, thus making more area for more adhesion.

TIREX's Selenium Neoprene Armor resists abrasion, acids, chemicals, corrosion, flame, moisture and oils. Jacket thickness conforms to Bureau of Mines tolerances. Jacket-molded Approval No. P-101 BM assures compliance with Federal and Pennsylvania Safety Codes.

TIREX Shuttle Car Cable with its cured-in-lead Selenium Neoprene Armor is available either with or without grounding wires. Write to the address below, or contact the nearest Simplex representative, to learn more about how TIREX can help you reduce shuttle car cable failure.

SIMPLEX WIRE & CABLE COMPANY

79 Sidney Street, Cambridge 39, Massachusetts

Pioneers in Research on Wires and Cables Since 1889

COAL AGE . April, 1958



PROLONGED CONFINEMENT

...keeping explosives at work behind the burden



A 100 ft. face . . . solid rock. A 7-hole "alternate pattern" ROCKMASTER shot. At 1/3 second, note how confined explosives force is stressing and shattering rock. Only leaks visible: a few small puffs of gas. Here's real blasting efficiency!



Bottom initiation confines blast. At 1 second, explosives still are hard at work behind burden . . . pushing it out from face. No wild flying rock. No spouting geysers of escaping gas.



Prolonged confinement pays off! No loud air snap. Vibration held to a minimum. Good, controlled throw. Here's a well-displaced 25,000-ton muck pile . . . well broken . . . ready for removal.

PROLONGED CONFINEMENT—the Rockmaster® way

Here's an outstanding example of blasting efficiency. The explosives are hard at work shattering rock . . . not air. The blast pays off by giving faster removal of the overburden . . . in economies all along the line.

Secret of this good shooting is prolonged confinement. The blast, initiated at the bottom of the holes with ROCKMASTER millisecond delay electric blasting caps, is confined behind the burden. It's the right combination of ROCKMASTER blasting caps and Atlas explosives that gives—

- good control
- greater efficiency
- improved breakage
- better public relations

To get the most out of your blasting methods and your explosives, discuss prolonged confinement with your Atlas representative. You can benefit by his ideas and experience. And get "Better Blasting"—Atlas' informative newsletter on latest methods and materials. Write us to put your name on our mailing list today.





Socony Mobil D.T.E. Oils have long set the standard for performance of hydraulic and circulating oils. Today, after many years of continuing laboratory research and several years of exhaustive field tests, we announce a completely new line of Mobil D.T.E. Oils. These are balanced to give much greater resistance to deposits, longer life even at high temperatures,

These new oils will meet the over-all requirements of your hydraulic and circulating systems better than any other product,

For further information on how new D.T.E. Oils can improve your production and cut costs, fill out the form below.

SOCONY MOBIL CORRECT LUBRICATION

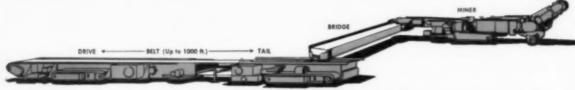
First Step in Cutting Costs

SOCONY MOBIL OIL COMPANY, INC., and Affiliates: MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION

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* your new	
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	New York

HERE'S A NEW RECORD!





The JOY "1-CM-EX-BELT" COMBINATION

points the way to increase your profit margin

Here's a mining team that can really slash your production costs, as the operating figures on the facing page adequately prove. The Joy 1-CM Continuous Miner, teamed with the Joy Extensible Belt Conveyor for continuous haulage, provides a combination that is the absolute last word in low-cost, high-production mechanized mining in seams of 52" and higher.

For lower coal, the popular 3-JCM Continuous Miner only 34" high over-all—takes over the extracting job. And for full-face mining in seams of approximately 6 to 8 ft., the powerful Joy Twin Borer is now available for continuous production at an 8-ton-a-minute clip.

The 1-CM Miner has a capacity of 4 tons per minute, is 45" high over-all, and will cut from 51/4" below floor to 90" above (120" with special equipment). It is available with two hydraulic roof drills of 4200-lb, thrust (note the photo-

graph above) making the 1-CM a fully integrated unit capable of handling both advance and roof control.

The Joy "Ex-Belt" Conveyor (see drawing above) now permits a continuous mining machine to operate almost without interruption in driving rooms and entries up as far as 1000 feet, including breakthroughs and taking pillar on retreat. It is available in 24, 30 and 36-inch widths and consists of two main units: a drive and a tail section with bridge conveyor, both self-propelled on identical crawler treads.

The "Ex-Belt" extends or retracts 50 feet while operating under full load. Belt tension and slippage are under automatic control at all times. A 100-foot length of belt can be added or removed, as needed, in an average time of only 5.3 minutes; and the entire system can be moved over and set up for a new heading in less than 2 hours.

FIRST - TONS PRODUCED PER MAN-SHIFT WENT UP 40%

when a JOY I-CM Continuous Miner was used instead of conventional methods

THEN, increased 69% more

when a JOY Extensible Belt Conveyor was added to provide continuous haulage

	1 MONTH'S RUN	1 MONTH'S RUN 1-CM MINER-"EX-BELT" COMBINATION
TOTAL PRODUCTION (RAW COAL)	17,818 TONS	21,925 TONS
TOTAL SHIFTS WORKE OFF)	AST TONS	39 562 TONS 831 TONS
AVERAGE PRODUCTION PER SHIFT. BEST PRODUCTION SHIFT. BEST PRODUCTION SHIFT. WORKING CREW CHARGED TO THE WORKING CREW SHIFT.	8/2 MEN	7 MEN
	53.8 TONS	80,3 TONS

The results above cover two regular periods of operation in a West Virginia mine. The coal is in the Pittsburgh seam and averages about 8 feet in thickness. It contains numerous clay veins up to 4 feet thick, resulting in both bad top and bottom when encountered, and requiring the hauling of considerable waste material. Mining height is limited to about 7 feet, leaving some head coal for roof support, and some bottom because of impurities.

In the first operating period of a month, the Joy 1-CM Miner was teamed with two Joy 10-SC shuttle cars unloading on belt conveyors. Production per man-shift averaged 53.8 tons, an increase of 40% over conventional mining methods. Size consist also improved with 1-CM production, with the sizes over ¾" increasing from 69.1% to 74.7% of the total, on the average.

In the second period, a Joy "Ex-Belt" Conveyor replaced the shuttle cars—and notice the results! Again a month's operation was checked. Production per man-shift jumped to 80.3 tons, an additional increase of 69% and a total increase of 100% over the methods previously used!

total increase of 109% over the methods previously used!
What would results like these do for your profit margin? Let us help you to secure real cost reductions under today's conditions, with rugged, field-proved equipment that is built to stay on the job. Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa. In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario.

Write for FREE Bulletin 14-1
Consult a Joy Engineer

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

Practical mining experience... plus top quality mining tools...

that's what Kennametal offers you

These are primarily mining men. All of them have state "papers" and training in mine rescue and first aid. In addition to their underground mining experience, they average 9.27 years as mine supervisors and 7 years

as field service engineers. These Kennametal men know and understand your problems and also know the qualities of the tools they sell.

Why not call in these mining specialists on your next problem?

These Kennametal Representatives together have a total of more than 500 years of practical mining experience

They can help you solve many tough mining problems, recommend the best tools for each job ... call on them any time



Division Manager 36 years mining experience



ROBERT J. McGINNIS Latrobe, Pa. 50 years mining experience



CHARLES P. ADAMS
Vincennes, Ind.
25 years mining experience



Carlsbad, N. Mex. 24 years mining experien



Bluefield, W. Va. 13 years mining experien



Cadogan, Pa.
39 years mining experience

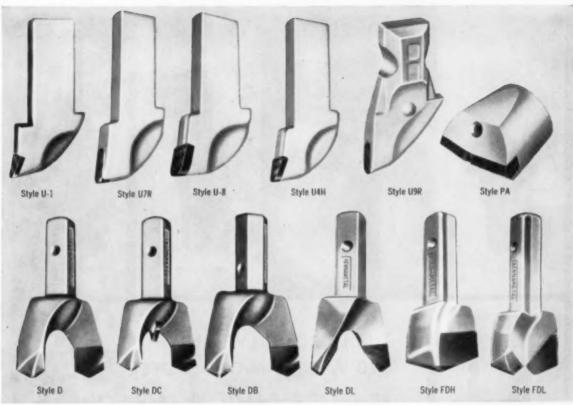


ORVAL ROBSON
Waynesburg, Pa.
23 years mining experience



ROBERT T. SMITH
Glenshaw, Pa.
42 years mining experience

There is a complete line of KENNAMETAL cutter bits, drill bits, rock bits, augers, pinning rods, accessories





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STEWART EDWARDS Waynesburg, Pa. 21 years mining experience



ABE L. GRAY Blairsville, Pa. 24 years mining experience



BIRCHELL R. HELTON Barbourville, Ky. 15 years mining experience



BENEDICT TEANO Oak Hill, W. Va. 19 years mining experience



DOUGLAS L. TUNSBERG Chattanooga, Tenn. 22 years mining experience



STANLEY TUROSKI Bedford, Pa. Rimersburg, Pa. 24 years mining experience 24 years mining experience



DICK W. WELCH





J. VAUGHN WILCOX
Springville, Utah
20 years mining experience
23 years mining experience



N D U S T R Y A N D ... Partners in Progress

Send for copy of the new Mining Tool Catalog

KENNAMETAL INC. Mining Tool Division, Bedford, Pa.











Remove Snap Ring



Remove Chuck



THE LE ROI-CLEVELAND S20 VAC-NU-MATIC STOPER

All models available in either SAV-A-CHANGE or Socket Type Chuck

● The new CLEVELAND S20 VAC-NU-MATIC dust collecting stoper is available in 3 feed lengths to suit any working height down to a 26" seam. It will produce a 30" hole in a 26" seam without using coupled steel. The 28" feed weighs 69 lbs. complete. Any model may be used either hand held or jumbo mounted. VAC-NU-MATIC bits are fast and free cutting and eliminate all stuck steels. Dust collection is positive even in wet top. Chucks may be replaced without dismantling the machine, using only a pair of snap-ring pliers. Cuttings are removed at the chuck housing and do not pass through the machine. Write for bulletin RD32 or let us demonstrate in your own mine.

For sales, service, information or demonstration in Pennsylvania and West Virginia contact: Schroeder Brothers — 3116 Penn Ave., Pittsburgh, Pa. or Acme Machinery Co. — Williamson, W. Va. In the Birmingham district contact Equipment Service Co., 617 North 9th St., Birmingham, Ala., or contact us direct from anywhere.





Division of Westinghouse Air Brake Co.





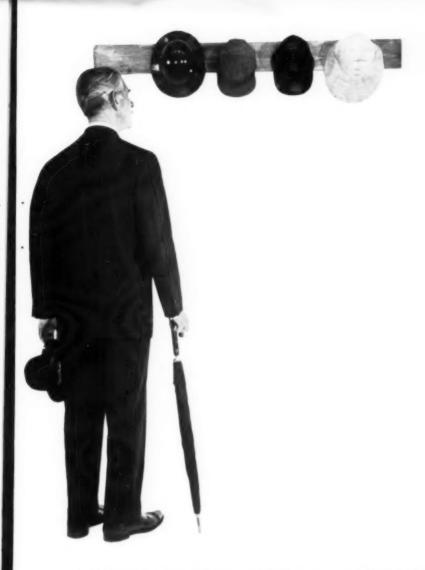








RD-71



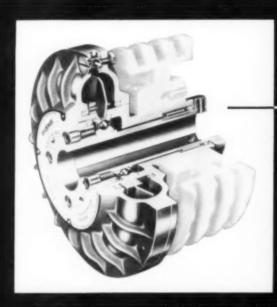
WICKWIRE ROPE DISTRIBUTORS WEAR MANY HATS

Wickwire Rope distributors are men who wear many hats. They are at home in the headgear typical of the numerous and varied industries they serve—the marine and fishing trades, the oil fields, construction, logging and many other industries having specialized wire rope needs.

These men aren't hat models—they can wear these hats because of their long experience in the industries they serve. Add to this their intimate knowledge of local conditions and their comprehensive Wickwire Rope stocks, and you'll see that your Wickwire Rope distributor is the man who can be of great help to you,

Yes, your Wickwire Rope distributor is a good man to know. He's quality people handling quality products. Buy your wire rope and wire rope slings from him. You'll find that the many valuable services he offers far outweigh any apparent price advantage you might gain by buying direct.





Performance!

- is the verdict from the field on

FLEXIDYNE

THE DRY FLUID DRIVE



Experience in the field proves that the new principle employed in Flexidyne provides a better way to handle difficult drive problems. Now delivered from stock, Flexidyne Drives and Couplings are used in a wide variety of applications. Already reports like these are coming in about Flexidyne performances in many tough assignments:

RAILROAD CAR PULLERS ... "Starts fine .. summer or winter!"

COTTON CARDS ... "Finally . . the soft start!"

TRAVELING CRANES ... "Spots our load . . and how!" PUMPS..."Now we are using smaller motors, too!"

VENTILATING FANS ... "Takes off smooth as silk!"

... AND OTHER HEAVY INERTIA LOADS..."Wonderful performance!"

Call the Transmissioneer, your local Dodge Distributor, for details about Flexidyne. Factory-trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone directory, or write to



of Mishawaka, Ind.

DODGE MANUFACTURING CORPORATION, 3000 Union Street, Mishawaka, Indiana



New Barber-Greene conveyor, erected in just $2\,1\!\!/_2$ days after the fire, boosts tonnage from 250 tons a day to 250 tons per hour.

Conveyor destroyed by fire on Monday New one operating Friday

On Monday fire roared up a wooden conveyor owned and operated by a Milwaukee cement block company. Out of the devastation only the wooden "A" frames remained. Without the conveyor, production was at a standstill.

At 6:00 the following morning the owner called the local Barber-Greene distributor to see what could be done. Drawing from his own stock of standardized conveyor components—trusses, idlers, drives—the distributor was able to rush all the necessary components to the burned out plant by noon. And by Friday morning the new conveyor was erected and operating.

This fire and the quick return to normal operations point up the basic advantages of Barber-Greene standardized components. These advantages include: quick delivery from stocks of standardized components...elimination of engineering time required when building "custom-made" conveyors . . . and fast, easy erection.

Trouble-free operation is an additional benefit of the factory aligned and adjusted drives and terminals. Flexibility in shortening or lengthening your conveyor is another plus.

Write for information on Barber-Greene Standardized conveyor components

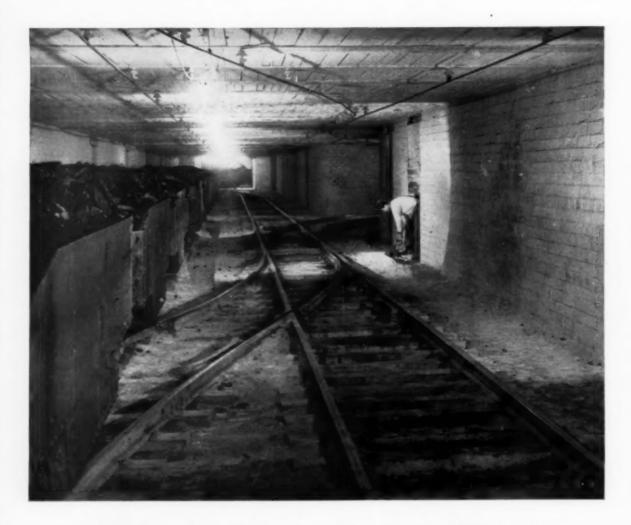
56-12-PE



CONVEYORS...LOADERS...DITCHERS...ASPHALT PAVING EQUIPMENT

COAL AGE . April, 1956

37



They can pour on the speed here

Heavy rail, good grading and alignment, precision turnouts and crossings—these and all the other aspects of up-to-the-minute haulage track are evident in this mine. Long, heavy trips can really pour on the speed here, to help chip away at the cost of bringing out coal.

One of the important factors behind the success of this mine-track operation is the planning put into it by Bethlehem trackwork engineers. They studied the mining plan and designed the layout that would best fulfill the requirements.

Such an approach results not only in smoothly efficient trackwork; it also shaves material and installation costs. That's because all Bethlehem trackwork is accurately pre-cut to size, curves are pre-formed to exact radii, and the various compo-

nents are completely assembled on our own layout floor to assure a perfect fit at the job-site. Thus waste is eliminated and installation can proceed at a high rate of efficiency.

All this may sound expensive, but it really isn't. It's actually less costly than cut-and-try methods. Many mines believe that their Bethlehem trackwork has paid for itself several times over. If you have any changes or expansion in view, you'll be starting off on the right foot by discussing your needs with a Bethlehem engineer. You can reach him through the Bethlehem office nearest you.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL





It's Skid-Shovel, dozer, clamshell and "carry-type scraper," all in one It's the International Drott 4-In-1!

Skid-Shovel position gives you a speedy, straight-forward, depth-controlled bucketfill. And to get "concrete-smashing" excavating force, just apply exclusive Drott triplepower, pry-action breakout! . . . Give the "machine selector" lever a finger-tip flick, for big-capacity dozing under hydraulic control . . . Another flick gives you a gravelgulping clamshell, with a 30-inch dumping height advantage over ordinary "roll-forward" buckets! . . . Another lever-flick, and Bullclam action is at your service-to heap-load the bucket like a carry-type scraper; to strip, grade, or spread with amazing accuracy, using clam lip control! And you select any Four-In-One machine action on the go!

It's the exclusive International Drott Four-In-One that arms you to beat a fleet of limited-duty rigs. Now available in 3 sizes, I-yard to 2½-yard capacity—all with the built-in protection of exclusive, shock-swallowing Hydro-Spring! Ask your International Drott Distributor for a Four-In-One versatility unlimited demonstration!



Ditch, grade, "dress shoulders" with Bullangledozer Attachment!

Remove bucket and attach this low-priced Bullangledozer—angle the blade to either side—then tilt the blade from the seat as desired with Drott's exclusive, roll-back action—and you've got a real

ditching, sloping, or shoulderdressing outfit. Or used as a straight dozer, this blade does heavy digging or fine grading under hydraulic "radius control." Give it a try-out!



International Harvester Company, Chicago 1, Illinois

INTERNATIONAL.

DROTT



11,250 NEW COAL HOPPERS

on order for New York Central System

An \$82,555,500 purchase order has been placed by the New York Central System for 11,250 new hoppers of 70-ton capacity—the largest single order placed for additional coal hoppers on record.

Deliveries on 6,600 of the new hoppers will start September 1, 1956. When the coal hoppers now on order are delivered, New York Central's fleet of hoppers then in service will be approximately 51,214 cars.

In addition to this new hopper purchase program, New York Central is keeping up a high-level record of coal car maintenance. New York Central moves over 1,121,200 carloads of coal a year into the nation's largest coal-consuming area.

Here is assurance of New York Central System's support to mine operators and coal consumers, in the round of expansion that is sweeping through the coal industry.

New York Central System

Route of the "EARLY BIRDS"—the one day faster freight service General Offices: 466 Lexington Avenue, New York 17, N. Y.

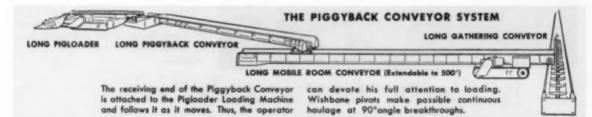


Up to 75% loading time per shift with PIGGYBACK Continuous Haulage Mining

By providing continuous haulage, the LONG Piggyback* Conveyor System delivers a steady, constant flow of material outby of the face area. The loading machine never has to wait for transportation—its rated capacity can be utilized throughout the entire loading cycle. As a result, with low-investment, low-maintenance Piggyback Mining, six hours or more loading time per shift is not unusual.

Every day more and more companies are learning that this exclusive LONG development pays off in higher total tonnages, more tons per man, and lower operating costs—regardless of seam height. What's more, the capital investment for the Piggyback System is much lower than for any other mining method. We'll be glad to supply facts and figures—without obligation.

*Trade Mark



For complete details or a demonstration, write us today!





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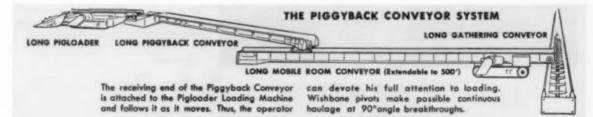


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*Trade Mark



For complete details or a demonstration, write us today!

LONG Company

SIMPLIFY MINE DRAINAGE WITH







USS NATIONAL* **PLASTIC** PIPE

Here is a light, flexible polyethylene pipe that unrolls like hose, yet possesses super toughness, excellent chemical resistance, and low flow resistance. You can lift a 200-foot roll of 2-inch pipe to your shoulder and carry it anywhereit weighs only 86 pounds.

Few joints are necessary since NATIONAL Plastic Pipe will turn bends, go over or under obstructions. It's easy to cut, and the fittings, when needed, are of the insert type, quickly secured with stainless steel clamps. No adhesive is necessary. Ells, tees, couplings, reducers and valves are available to suit any lavout.

USS NATIONAL Plastic Pipe resists attack by a wide variety of acids, alkalis, salts and many other chemicals. And, of course, it won't rust or corrode. Rough handling won't crack it, even at low temperatures. In fact, it remains tough and flexible over its entire working range from minus 90° F. to plus 120° F.

Manufactured from only the purest 100% "on grade" polyethylene raw material, NATIONAL Plastic Pipe is available in sizes from ½ inch to 6 inches in diameter, in a variety of wall thicknesses. Find out how NATIONAL Polyethylene Plastic Pipe can be applied to your mine drainage system by writing for full information to National Tube Division, United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa.

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA. UNITED STATES STEEL EXPORT COMPANY, NEW YORK



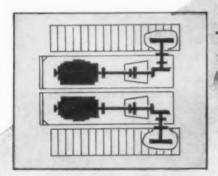
NATIONAL plastic

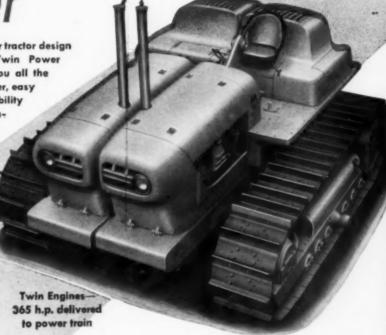
Biggest Tractor News in Years...

the "Euc" TC-12

Twin Crawler

Here's a completely new concept of crawler tractor design and performance . . . the new TC-12 Twin Power Euclid. It's designed and built to give you all the features you want in a tractor—more power, easy operation, greater workability and accessibility for servicing . . . and all power train components are matched, with years of application in earth moving equipment.





SPECIFICATIONS

total h.p.—388 h.p. at rated speed available for tractive effort—365 h.p. speeds—3 speed ranges forward and reverse to 8.3 mph

drawbar pull (bare tractor) forward and reverse 54,000 lbs. low range 53,500 lbs. Intermediate

53,000 lbs.	53,000 lbs. high range	
track width (standard shoe)	26"	
track gauge	110"	
overall width	11' 4"	
overall length	16' 2"	
height (excluding stacks)	7' 11"	
drawbar height	23"	
ground clearance	20"	

operating weight (bure) approx. 58,000 lbs.

Powered by two diesels with separate Torqmatic Drives for each track, the TC-12 has 365 h.p. available for tractive effort—a smooth steady flow of power to meet any job requirement. There's no master clutch and no manual gear shifting . . . the operator simply moves a lever to select one of three speed ranges—forward and reverse—for travel speeds up to 8.3 m.p.h. Maximum drawbar pull is equal to, or greater than, the weight of the tractor and any attachments.

Each half of the tractor is separate and free to oscillate on a single transverse shaft. This gives the TC-12 maximum stability and traction on rough ground. The tractor can be easily separated into two halves for shipment when necessary.

Never before so much workability!

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio



Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE



FIRST WE DEVELOPED 1105 ROPE WIRE.



THEN WE MADE ROEBLING'S



1105 takes Royal Blue out of the ordinary wire rope class.

1105 is a rope wire that's new-that's stronger. It's the biggest news in many years.

1105 is the result of more than a century of research and development—it's the wire that gives Roebling Royal Blue the stamina that pays off in service.

Contact your Roebling distributor or write us for the full story.

ROEBLING

Subsidiary of The Colorado Fuel and Iron Corporation



JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, M. J. GRANDMEE: ATLANTA, 994 AVON AVE. . BOSTON, SI BLEEPER ST. . CHICAGO, 5525 W. ROGBEVELT RD. . CINCINNATI, 3253 FREDONIA AVE. . CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. . DENVER, 4801 JACKSON ST. . DETROIT, 918 FISHER BLOG. . MOUSTON, 6216 NAVIDATION BLVD. . LOS ANDELES, 5240 E. HARBOR ST. . NEW YORK, 19 RECTOR ST. . DOESSA, TEXAS, 1920 E. 3ND ST. . PHILADELPHIA, 230 VINE ST. . SAN FRANCISCO, 1740 177H ST. . SEATTLE, 900 187 AVE. S. . TULBA, 321 M. CHEYENNE ST. . EXPORT BALES OFFICE, 19 RECTOR ST., NEW YORK 6, N. Y.

Totally Protected FROM CORE TO

RELIANCE
Finally Protested
MOTORS

COVER

The total protection concept of design and construction armors Reliance A-c. Motors against everyday hazards, with little or no maintenance. Total protection is made up of extra features like:

Slot cell insulation of Double Backed Mylar

Dynamically balanced rotor for vibrationless operation

Entire insulation system impervious to acids, moisture and oils

Metering plate regulates grease flow to bearing

Ventilation louvres positioned high and dry in end brackets

There are 100 of these extra core to cover protection features in Reliance Motors. Each point is covered in our bulletin, "Check the Facts."
Why don't you write for one and get all the details?

RELIANCE ENGINEERING CO.

Cleveland 10, Ohio • Offices in Principal Cities
Canadian Division: Welland, Ontario



How soon will the Yieldable Arch start saving money for you?

Install Bethlehem Yieldable Arches in your mine, and they'll probably maintain their structural integrity throughout the service life of the shaft. And when you figure the initial cost of the Yieldable Arch against the cost of frequent timber replacements, you'll readily understand why so many mining men say the arch pays for itself in its first year of service.

On top of that, you'll find it a simple matter to take down the arches and re-use them at other locations. You have good reason to expect 100 pct recoverability!

The Yieldable Arch is made up of rolled-steel segmental sections which

are heavily flanged to resist buckling and torsional stresses. One segment nests inside another in an overlapping joint. Rugged U-bolt clamps, used in pairs to secure the joint, are drawn up tightly enough to hold fast under normal loads.

However, when unusual pressures begin to bear down, the joints can give sufficiently to relieve the load. Thus safety underground is maintained.

Each arch set is tied to its neighbor through a series of horizontal braces, to provide lateral rigidity in the structure. Timber lagging is usually used, but steel lagging can be furnished if desired. Your own

men can install Yieldable Arch sets without special skills or constant supervision.

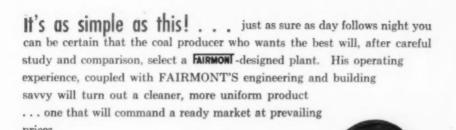
The arches shown in the photograph were especially designed for this particular job; your own mine might well use the standard Yieldable Arch. One of our engineers would welcome a chance to look into the matter with you to see how you might benefit from this new and economical development. How soon?

BETHLEHEM STEEL COMPANY BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL





Operators who know their coal cleaning use **FAIRMONI** - built preparation plants

Call in a Fairmont engineer when you plan to build or modernize. Let him show you how you, too, can have a FAIRMONI -built preparation plant with over 99% separating efficiency through a wide size range in any tonnage capacity.

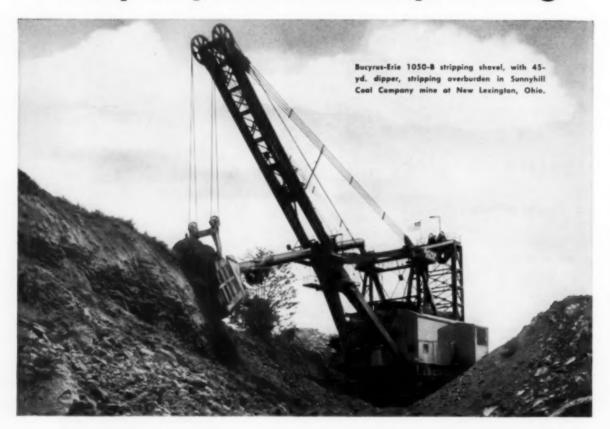
FAIRMONT

MACHINERY COMPANY
FAIRMONT, WEST VIRGINIA

DESIGNERS AND CONSTRUCTORS OF COMPLETE COAL PREPARATION PLANTS USING BOTH WET AND DRY CLEANING, CENTRIFUGAL AND THERMAL DRYING.

MODERNIZATION:

key to profitable strip mining



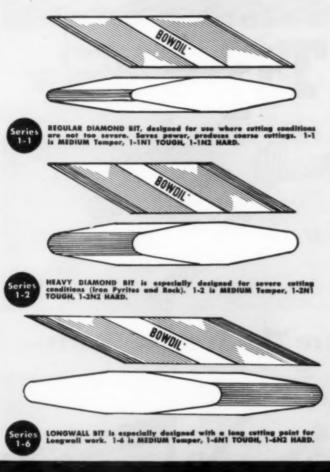
BUCYRUS - ERIE STRIPPING SHOVELS: key to efficient modernization

When you modernize with a Bucyrus-Erie stripping shovel, you've taken a long step toward the big output, low-cost stripping necessary for profitable operations.

These long range stripping shovels offer frontend design featuring superior strength with minimum weight, powerful digging action, and long life. Ward Leonard variable-voltage control provides quick response, smooth acceleration and deceleration, and flexibility of operation that maintains high operating speed for maximum output.

Modernization is a major part of the solution to the problem of rising costs - Bucyrus-Erie stripping machines can provide a major part of any modernization program in strip mining. 50155

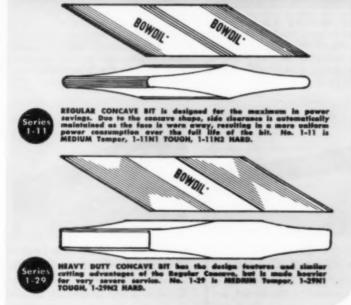
Wisconsin



There's a BOWDIL® Bit for every cutting need!

These various types are designed for specific requirements, are made from special alloy steels and are heat treated to three different tempers as listed. Through many years of research on actual conditions in the field, these styles, shapes and hardnesses of Bowdil Bits consistently prove the most popular. We are happy to offer our experience and recommendation for your individual need.

TO HELP YOU RE-ORDER, PLACE YOUR TYPE BIT ON THESE ACTUAL SIZE DRAWINGS





Gentlemen: Rush us

NO. BITS
(Quantity)
Name
Address
City State

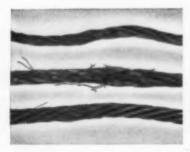
BOWDIL COMPANY

Boylan Ave. S. E. Phone GLendale 6-7176 CANTON, OHIO

Tuffy Tips



This Is Often Where The Trouble Starts...



Here are three types of open kinks, all resulting from mishandling of wire rope. Guard against kinks by winding rope properly on the drum, and never pull a loop smaller, always enlarge it then straighten out the rope.



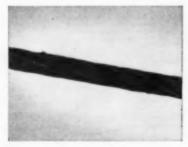
The start and finish of doglegs; the end being the point when all the wires on one side of the rope were worn through. Anything, such as a "pulled loop, that causes a permanent bend or "set" will result in a dogleg.



While different wire rope is constructed to resist abrasion to different degrees, improper use leads to injury. Watch for abrasion and when it begins to show locate the point where it is occurring and correct the cause.



Severe corrosive water conditions caused rust and corrosion to produce a one-strand break in this rope. Lubrication during the time the rope was in service would have retarded the damage...added greatly to the rope's life.

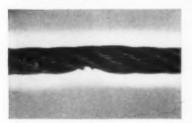


If broken in improperly, high strands like these may result. When installing, make sure that the fabricated relation between strand with strand and strands with core are not changed.



Nailing a wire rope through the core often causes many undesirable results. The wires and the core are badly damaged. A high strand may develop near the end or many feet away.

Broken Rules Break More RE ROPE Than Capacity Loads



The photo at the left shows what happens when rope is run over or struck by a hard object and crushed. The damage to the strands greatly reduces the service life so carefully built into the rope.

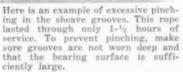
Photo at the right shows how sudden re-lease and rebound from an over-stressed condition may often cause birdcaging. Throwing a loop into the rope is also a major cause of birdcaging. Lang Lay ropes in particular are vulnerable to this



Forget Complicated Specifications -Just say Tuffy!









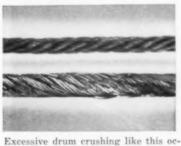
Tuffy Dozer Ropes

Constructed to increase rope life. 1/2" and 9/16" sizes on reels. Less frequent slip-through for cut off. No waste of sound rope.



Tuffy Dragline

Two big working advantages: (1) Outer wires have large area to resist obrasion. (2) Inner structure is flexible for occurate casting.



curs at points of cross-over or when rope is wound unevenly. Check for even winding of each layer on the

drum to prevent crushing of this type.

Tuffy Slings

Constructed to stay extra flexible; kinking or knotting won't materially damage. Unique and strong 9-part machine braided wire fabric con-struction. With Tuffy Hoist Lines, Tuffy Slings give you a team of balanced performers.



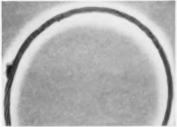
Tuffy Slusher Rope

A special 3-strand construction which combats rope killing conditions of slusher loading such as drum crushing, extreme abrasive wear and shock loading. Easily spliced.



Tuffy Scraper Rope

Tailored to cope with the com plex destructive forces imposed in the rush of making more round trips or in tough going.



When a popped core occurs, continued use causes the rope lay to lengthen out considerably. This displacement of the core is usually caused by load tension being suddenly removed from the rope.

Your Tuffy Distributor: Dependable Source of Information.

His job is more than just supplying the wire rope you want-when you want it. Your Tuffy distributor is always on the alert to help make your equipment do the best possible job, at the lowest possible cost. When you have a problem that calls for special knowledge concerning your equipment that uses wire rope, give your Tuffy distributor a call. He'll be glad to furnish the help you need including factory engineers.





union Wire Rope corp.

2130 Manchester Avenue Kansas City, 26, Missouri

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He's making the loop-lock half-hitch in Plastic Wire Countered Primacord

. . . the strongest, toughest Primacord Detonating Fuse ever produced. Its tensile strength is 300 pounds - a big margin of safety when loading. It is waterproof and resistant to acids and abrasion - ideal for use in deep, ragged, wet holes - wherever down-hole conditions are tough.

Primacord is the insensitive detonating fuse which made the giant blast practicable. Today, it is also recommended wherever holes must remain

"standing" - wherever there is any danger of stray electrical currents. Because Primacord must be detonated. It cannot be set off by sparks, friction, ordinary shock or stray electrical currents, and even a direct hit by lightning failed to detonate it. But once detonated, it will carry its powerful detonating wave at 4 miles per second to every hole in the hook-up - for a blast that makes

good digging

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PRIMACORD

The Proved and Approved DETONATING FUSE

52



APRIL, 1956

IVAN A. GIVEN, EDITOR

Hunting Sales Opportunities

EVEN THOUGH COAL'S COMPETITIVE BATTLE has taken a favorable turn, the infighting still is arduous, to say the least. The bright future for the industry as a whole provides minimum cause for relaxation in the sales department of any individual company since each company or group must solidify its own position in the market.

The industry's wonderful rebound in the past year and a half contains less luck than design. The developments in the Ohio River valley did not just happen, they are a direct result of aggressive market-making actions initiated years before by foresighted coal company leaders. Similarly, events in Florida, where coal is making inroads in a power market it never could crack before, are the result of hard selling backed up by a willingness to invest in the transportation facilities required to serve this market.

The coal pipeline to Cleveland is another example of how coal can win out when producers match high production efficiency with equivalent distribution efficiency. The increasingly familiar picture of coal mines discharging the product directly into power plant storage yards also demonstrates the value of target-centered selling.

What we are seeing, we think, is a change in coal merchandising which closely parallels recent changes in production methods, where the batch process is giving way to continuous flow. The new look in marketing shows coal companies selling a complete fuel service, rather than peddling coal by the ton.

However, these happy circumstances are not confined to large companies only. Companies of all sizes are carefully selecting sales targets they can strike accurately and hard, such as new schools, industrial plants, larger combined shipments or whatever.

Then when the coal pipeline proves its merits we may see the development of central preparation plants, collecting raw coal from a number of producers or from several mines and feeding the finished product into pipelines. But sales targets of this type do not pop up—they must be set up.

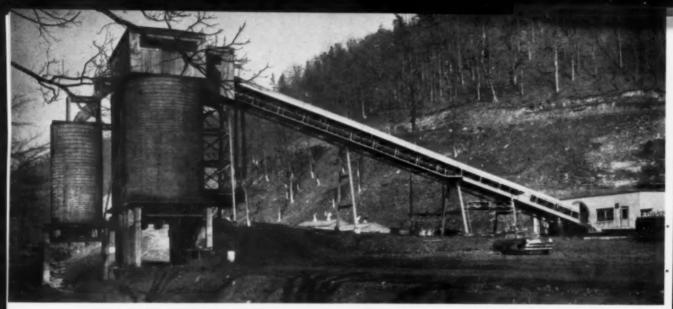
Accent on Safety

THE MONTH OF JANUARY was a black beginning for 1956. In the nation's coal mines 56 men lost their lives, according to a Bureau of Mines report. Roof falls were the cause of 35 of these fatalities. Renewed emphasis on safety is called for, including closer supervision and strict adherence to good roof-support practices.

Whether the tragic lapse galvanized into action the officials and men in the mines will have to be proved in the months ahead. At any rate, late reports from the Bureau on the February fatality toll show a total of 31 fatalities, 19 caused by roof falls. While still not good enough, this February performance is a decided improvement over the preceding month and over February, 1955, when 47 men lost their lives, including 27 from roof falls. Accelerated progress in this direction is needed now.

Meeting of Minds

ONE OF THE ANNUAL HIGHLIGHTS for management, engineering and operating officials in the industry is the Coal Convention of the American Mining Congress. For this year's meeting at Cincinnati, May 7-9, an excellent program has been arranged covering subjects of immediate interest, such as, continuous mining, coal preparation, haulage and power, maintenance, strip mining, roof support and industrial engineering. The full program for the 3-day meeting appears on pp 120 and 121 in this issue.



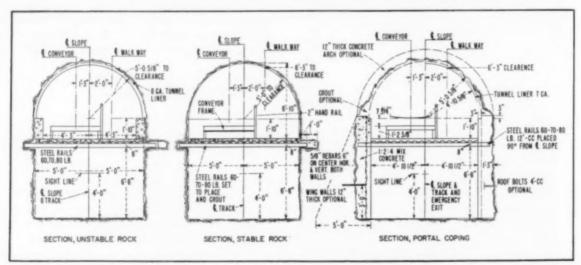
CONCRETE-STAVE SILOS receive coal from 42-in belt conveyor in slope and store it for delivery to trucks.



FAST TRUCK LOADING in 1 min or less is achieved with pushbutton control of high-volume loading gates in silos.



SKI-TOW eases walk up 700-ft slope at end of shaft at Amherst's new opening. Steel lining protects men and belt.



CONSTRUCTION DETAILS of Dana slope show double-deck opening with arched roof. Upper section houses slope belt and manway, lower compartment serves as supply road and emergency escapeway.



NEW PORTAL at Amherst Coal taps 3,000 Ac of coal. High speed truck haulage in rugged West Virginia hills links new opening with cleaning plant in adjacent valley, eliminating need for long underground haul.

Efficient Haulage Stressed at New Amherst Portal

New ideas in slope construction coupled with smooth, efficient overland transportation mark West Virginia operation tapping 3,000 acres of coal.

A DOUBLE - DECK SLOPE, fast pushbutton truck loading and high-speed overland haulage are features of the new Dana slope of the Amherst Coal Co., Rensford, W. Va. Designed to provide access to an additional 3,000 Ac of No. 2 Gas coal, the new facilities keep travel time to a minimum and eliminate the need for maintaining an old underground haulway.

As the original reserves included in the No. 4 mine dwindled, management had to decide how the new reserves located still farther from the cleaning plant should be developed. They were faced with a choice of either extending the haulways in the old mine or sinking a new slope or shaft directly to the new reserves. If the underground route were chosen, a long haulway would have to be maintained through the old workings for many more years. And a sizable reserve would be tied up in barrier pillars protecting the haulage road. If a new opening were made, it would have to be located in the next valley beyond the preparation plant on the Point Lick Branch of Campbell Creek.

After weighing the pros and cons of the two choices and carefully calculating the cost for each, management saw that the advantages were strongly in favor of the new portal. The next problem facing the company was the choice of a transportation system to carry coal from the new opening to the preparation plant. Possible methods studied included an aerial tram; a tunnel through the mountain and a system of conveyors; rail haulage with diesel-electric locomotives; and trucks. Again careful consideration was given to the merits of each method in meeting the needs of the company. After all systems were analyzed the balance was tipped in favor of trucks.

DEVELOPING THE MINE

The decision to use truck haulage affected every phase of the mine development. Storage capacity was needed to permit underground work to continue uninterrupted and also so that coal could be brought to the surface regardless of whether trucks were there or not. Surface facilities had to be designed to permit trucks to load and unload as quickly as possible. A



DESTINATION for loaded trucks is hillside bin 3½ mi around the mountain from silos. Round trip takes 20 min.



CONNECTING LINK between bin and cleaning plant is belt conveyor carrying coal to plant for preliminary screening.



STOCKPILE of raw 6x0 is built up from preliminary screening product to provide uniform feed to cleaning plant. Two parallel belt conveyors handle coal.

smooth, well-aligned road with no steep grades had to be provided to link the mine with the cleaning plant.

With these needs in mind, the company pushed ahead with work on the opening. To provide a truck route with a maximum grade of 5% against the loads and 6% with the load, a 3½-mi road was built around the mountain-side to link the new portal with the cleaning plant. To assure a constant supply of coal for the trucks, two 250-ton Marietta concrete-stave storage silos were built near the portal. A third silo is used to store mine refuse.

Since the company decided on truck haulage, every effort was made to provide facilities to load and unload them in the shortest possible time. Special gates were fitted into the bottoms of the silos to permit fast loading. These are operated by truck drivers using pushbuttons under the bins. The gates are designed so that a 25-ton truck can be loaded in a minute or less.

TWO-COMPARTMENT SLOPE

At the edge of the mountain opposite the silos a slope was driven 10 ft wide by 14 ft high to tap the coal seam. Excavation work began early in 1953 and the slope and 240-ton underground bin were completed in October. The slope intersected the coal at the 700-ft mark and was extended downward another 126 ft to a point under the center of the storage bin.

An unusual feature of the slope is

the double-deck construction that separates the passage into an upper beltway and manway, and a lower supply road. The company decided on the double-deck construction because the various rock strata through which the slope was driven were known to be unstable.

By keeping the horizontal span to a minimum of 10 ft, the company believed that a minimum of roof trouble would be met. This reasoning proved to be correct as the slope was driven. To provide enough space to permit the slope to be divided into the two compartments, the opening was excavated to a height of 14 ft. Roof bolts were installed as the slope was driven and a large portion was lined with Armco corrugated tunnel liner, particularly in the weaker or unstable rock.

Soft shale, sandstone streaks, fireclay and medium-hard black shale were the predominate materials met in the slope. The job of driving the slope was contracted to Vescillio & Grogan, Beckley, W. Va., who used an Eimco rock-loading machine to load the blasted rock directly into the cars which were hoisted to the surface and

To divide the 10x14-ft slope into two compartments, steel rails were set in hitches in the rib 6 ft above the floor. The rails then were covered with corrugated sheets and a layer of concrete was poured to form a partition between the upper and lower sections. This work was started at the bottom of the slope and progresses upward to the portal.

The upper compartment houses a 42-in Barber-Greene belt conveyor that carries coal to the storage silos and a manway with a skitow. The



PUSHBUTTON CONTROLS at underground dump permit dispatcher to control flow from underground bin to silos.



REVERSIBLE CONVEYOR, controlled from underground dump, distributes coal to either of the 250-ton coal silos.

lower compartment serves as a supply road, main intake and emergency escapeway.

PUSHBUTTON CONTROL OF COAL TO SURFACE

The flow of coal or rock to the surface and distribution to the silos is controlled from a panelboard at the underground dumping point. From this point, the dispatcher can control the various units in the transportation system. For example, he can do any of the following: (1) stop the Syntron feeder under the underground bin; (2) run the belt manually with the feeder stopped to remove the coal from it; (3) divert coal to either of the coal silos; and (4) divert rock to the rock silo.

There is a group of indicator lights that shows the level of material in each of the silos. If a coal silo is empty a green light appears on the board; if half full, an amber light goes on; and when the silo is full a red light flashes. Only the green and red signals are used to show if the rock bin is empty or full. All of the underground controls are connected to a master panel in the hoist room.

To prevent the slope belt from being torn by a large piece of rock which might be riding off-center on the belt, paddle switches have been installed at various points along the belt. If rock strikes one of the paddles, the belt stops and cannot be restarted until the paddle has been repositioned.

CROSS-MOUNTAIN HAULING

A fleet of five 25-ton Autocar enddump trucks carries the coal from Dana slope to the 300-tph cleaning plant located across the mountain from the new portal. Two of the trucks are powered by 300-hp Cummins diesel engines while the others are driven by 200-hp Cummins units. Traveling at speeds up to 40 mph, the larger trucks can make a roundtrip, including loading and unloading, in about 20 min. The smaller trucks travel slower on the upgrade when loaded, and therefore take about 30 min to make a round trip. Trucks unload into a 120ton hillside bin, from which it is carried to the cleaning plant by a 42-in belt conveyor.

When the coal arrives at the top of the plant it is separated into plus 6-in lump and 6x0 fractions. The 6x0 flows to a 30-in discharge belt that carries it outside the plant to a raw-coal stockpile. The stored coal serves as a source of coal for the washer and permits an even plant feed. The handpicked lump coal flows to apron-type loading booms and is loaded into railroad cars.

JIG WASHING

A feeder under the raw-coal stockpile deposits coal onto a 36-in return belt, which carries it to the top of the plant. It then drops onto a 60-in transfer belt equipped with a Dings magnetic pulley that removes any tramp iron before the coal passes to a pair of Jeffrey Baum-type jigs.

Clean coal flows to a Link-Belt vibrator for sizing into 6x4, 4x2 and 2x0 fractions. The two larger sizes drop onto a four-compartment conveyor for loading separately or for mixing before loading. The 2x0 flows to a pair of Robins Eliptex dewatering screens for sizing into 2x11/4,

11/4x1/4, 1/4x28M and 28Mx0 fractions.

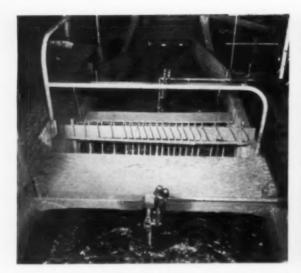
The \(\frac{1}{4}x28M \) is pumped by an Allis-Chalmers \(4x5 \) unit to a pair of dewatering vibrators equipped with stainless steel screen cloth. The dewatered product drops onto a flight conveyor that discharges into a Reinveld centrifugal dryer. The dried product drops onto a flight conveyor which can distribute it to any one of three loading tracks for mixing with other sizes or loading separately. The 28x0 fraction is pumped to a settling pond by a Goyne slurry pump.

The 6x4, 4x2 and 2x1¼ can be conveyed to a Jeffrey single-roll 30x30 crusher. After reduction, the coal flows to a pair of Robins vibrators for sizing into stoker or nut and slack fractions. Any of the final products from the cleaning plant may be treated with hot oil applied by a Viking spraying system.

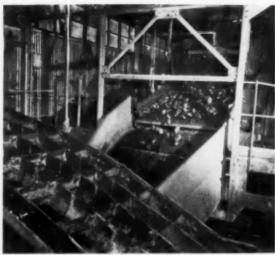
MINING SYSTEM

Mining is in the No. 2 Gas seam which is comparatively hard in structure at Dana slope. Averaging between 4 and 5 ft in thickness, the coal has only a thin band of impurities. A laminated sandstone forms the immediate roof and is very difficult to control. A fireclay, which varies from soft to hard, underlies the coal.

A development crew, including six to eight men, advances the six headings in the main entry. Using a Joy 14-BU loader, one 6-SC shuttle car, Jeffrey 35BB cutter, Acme Jumbolter, this crew drives three headings at a time, alternating between the left and right sides of the entry. For example, the crew advances the three headings on the left side to a point beyond the first breakthrough inby an entry pro-



COAL WASHING is assigned to a pair of 4-cell Baum-type jig washers that handle 6x0 raw coal at Amherst.



DEWATERING and sizing of washed product is done by vibrator. Four-compartment conveyor carries coal to cars.



SECONDARY SIZING of washed 2x0 into 2x1¼, 1¼x¼, ¼x28M and 28Mx0 fractions is also assigned to vibrator.



DRYING of ½x28M previously dewatered on vibrator is completed in centrifugal unit before flowing to railroad cars.

jected off the mains. The crew then drops back and drives the three headings on the right as far as those on the left. Breakthroughs between the right and left groups of headings are kept to a minimum to provide a tight wall between the intake and return air circuits.

The main-entry crew also develops the room entries. By alternating between the two assignments, the crew is able to keep enough territory developed ahead of the production crews. Currently there are three production crews working at Dana slope. A fourth unit will be added as soon as the old mine is worked out.

Production units include a Joy 14-BU loader, 11-RU cutter with Schroeder hydraulic drill, two 6-SC shuttle cars, elevating conveyor, Acme Jumbolter or two Cleveland stopers.

Room crews are made up of a loader operator and helper, cutter operator and helper, two shuttle car operators, two roof bolters, one elevator operator, one timberman and one foreman, a total of 11.

Room entries are driven 18 to 20 ft wide to their projected limits, after which rooms are driven off the left side in groups of four, except the initial group of five. This system provides four working places in room pillars plus the chain pillars in retreat work. The first room headings were driven with headings, breakthroughs and rooms on 80-ft centers.

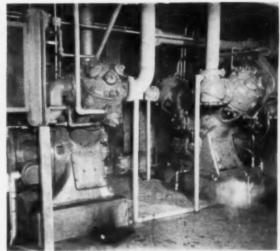
However, the company had some trouble controlling the weak sandstone overlying the coal. As a result, mining projections for room entries have been changed. Headings and rooms now are laid out on 60-ft centers with heading breakthroughs spaced on 80-ft centers and those in rooms on 70-ft centers. The goal with the new projections is to make smaller pillars which can be extracted rapidly before the roof deteriorates.

ROOF SUPPORT STRESSED

Because of the unstable nature of the roof, rigid roof-support standards have been adopted. Roof is supported by roof bolts with $6x6x^{1/4}$ -in bearing plates in regular or normal conditions. Where the roof has a tendency to break between bolts, $4x4x^{1/4}$ -in bearing plates with wood headers are used.



TANDEM locomotives, made up of 13-ton units, handle the main haulage job. Loop haulage speeds transportation.



STATIONARY COMPRESSORS, located on surface near portal, provide compressed air for roof drills in all sections.

All roof bolts are 5x42-in expansionshell type.

In narrow 12-ft-wide headings bolts are installed 4 ft apart in a line across the heading and within 4 ft of the face before cutting. Lines are 4 ft apart and bolts are staggered in alternate rows, thus forming a diamond pattern.

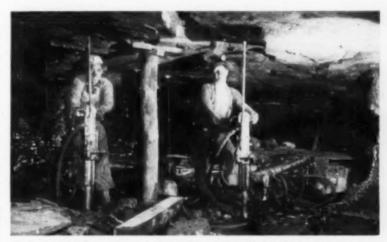
In room headings and rooms, which are driven 18 to 20 ft wide, wood posts with half headers provide additional support. These are set on 4-ft centers in rows along both sides of the opening and 6 ft from the centerline. Where bad roof occurs, additional timbers are set. When a large area of bad roof is met, 2x8-in by 14-ft crossbars are set on 4-ft centers with two wood legs and three bolts. In an average shift a bolting crew will install about 80 roof bolts while keeping pace with the mining cycle.

LOOP HAULAGE

To provide a smooth flow of coal from the section to the slope bottom, Amherst uses loop haulage in the working areas. Shuttle cars discharge onto a Joy elevating conveyor that transfers coal to 3-ton steel dropbottom mine cars. The loading point operator controls the loading and moving of the cars in the section.

Two mainline locomotives, made up of two 13-ton units, service the four mining sections. One unit serves the development area while the other pulls coal from the remainder of the mine. The loop haulage system permits one gathering locomotive to handle the three room entries.

Temporary track is laid with 40-lb rails on steel ties as development progresses. It is later replaced with



ROOF BOLTING equipment includes this self-propelled twin-arm unit. Two men install 42-in bolts with 4x4x½-in plates in cycle.

permanent track consisting of 80-lb rails on creosoted ties ballasted with crushed limestone.

POWER

Power is delivered to the mine through boreholes that intersect the main entry. Substations are located on the surface adjacent to the boreholes and power is delivered underground at 250 v DC. New boreholes are drilled and substations relocated as mining progresses and transmission distances approach an economic limit.

Two 300-kw Westinghouse rectifiers provide the DC power for underground equipment. One unit is located at the slope portal and the other at a borehole. Both stations are housed in Armco steel buildings. The borehole unit is considered as a permanent installation but the portal unit is considered a temporary setup and is skid-mounted for easy moving from place to place.

Fresh air for the mine is supplied by a Jeffrey Aerodyne fan delivering 72,000 cfm at 1.8 in water gage. To provide ventilation for worked out areas, a set of bleeder headings is maintained along the property line. Air is directed over the mined areas and returned to the fan through the bleeders. When the mine workings become more extended, an additional airshaft will be sunk as needed to provide better ventilation close to the producing sections.



Truck-mounted drill provides better overburden preparation on separated tracts requiring a highly mobile unit. Big benefit is an immediate increase in recovering scattered reserves of coal.

HIGHLY-MOBILE truck-mounted overburden drill and bigger draglines materially increase recoverable reserves in separate tracts of coal at Mays Coal Co. operations in Clarion County, Pa. Drill can work close to edge of highwall if necessary.

Improved Overburden Drilling



BULLDOZER prepares drilling bench, leaving a skin of soft material for better bit starting and to provide natural blasting mat to prevent flying material.

HIGHER - CAPACITY OVERBUR-DEN DRILLING for the strip-mine operator who has a fair share of his reserves in scattered deposits is the big advantage in the truck-mounted dry rotary drills now coming into increasing use. The units are highly maneuverable on the job and easily moved from one job to another on short notice. This is "just what the doctor ordered" for the hilly terrain of the central and western Pennsylvania counties, where contour stripping is common and where a company's tracts may lie in a number of separate hilltops.

One example of this application is seen in the operations of Mays Coal Co., Clarion, Pa. (Coal Age, August, 1952, p 100), which employs the services of a drilling contractor's truckmounted Davey drill to achieve low-



BLASTHOLES ARE CHARGED with explosives as drill approaches end of job. Holes are 25 ft apart, rows 20 ft apart.

cost, efficient overburden preparation.

The company's reserves are mainly in the Lower Kittanning and Lower Freeport seams, the Lower Freeport lying about 125 ft above the Lower Kittanning. Both are accessible for stripping in the Clarion-County hillsides. Between these two are the Middle and Upper Kittanning seams, which contribute less than one-third of the company's total production of about 200,000 tons per yr. The truckmounted drill was observed in operations on the cover of the Freeport seam. Thickness of the coal is about 4 ft, including a thin layer of rider coal that is cleaned off before loading.

PREPARING BLASTS

Overburden consists of about 25 ft of hard strata, including 5 ft of sandstone about 7 ft above the coal, and up to 20 ft of softer material which can be bulldozed into the pit. The bulldozer, an International TD-24, constructs the drilling bench, leaving a skin of the relatively softer material on top of the hard rock to permit easier blasthole starting for the 5%-in drill bit and to provide a cushion to prevent excessive flying of the harder rock when blasts are detonated.

In this sort of set-up the blasthole drill, owned by Ralph Toy, drilling contractor, and operated by Mr. Toy with the help of one assistant, produced 22 blastholes in the 25-ft-thick hard rock in a pattern starting with a row of holes 20 ft from the highwall. The next row is staggered with and 18 ft in back of the first and the next two rows also are staggered from each other and progressing backward distances of 18 ft and 17 ft respectively. Purpose of the decreas-



BLASTING ENGINEER, R. W. Brehm, checks hole clearance and depth (above) before placing six or seven cartridges in each hole (below). Special primer cartridge, set off by detonating fuse, is required to initiate the stable explosive in the main charge. Charge may be placed in wet holes if detonated in 8 hr.





CLEANING EQUIPMENT, including overhead loader, broom and grader, and loading shovel will recover exposed coal.



AFTER THE SHOT Mr. Brehm returns to inspect fragmentation and make sure the dragline can safely go to work in removing newly broken overburden.

ing width of rows is to compensate for increased solidness. The complete round (drilling, charging and detonating) was made in one 9-hr shift.

The overburden explosive, du Pont Nitramite, is supplied by Stockdale Mine Supply Co., Frostburg, Pa., also the distributing agency for Davey drills. Stockdale employees deliver the explosives to the job and help in charging the holes. R. W. Brehm, du Pont blasting engineer, Pittsburgh, supervised charging and detonation of the round. Mays Coal Co. officials avail themselves of services like these to make sure they get a good return

in broken rock out of their investment in explosives.

USING STABLE EXPLOSIVE

The new explosive, Nitramite, is a straight ammonium nitrate product having a detonation velocity of about 12,000 fps and a strength equivalent to that of 45% ammonia dynamite. Cartridges are 5x24 in and weigh 16% lb. The cover is two-ply, spiral-wound paper with asphalt waterproofing between the plies, providing a cartridge that can be placed in wet holes if detonation takes place within 8 hr of placement.

The explosive is not cap-sensitive. It is detonated by a special 4½x10-in by 6-lb primer in the blasthole. The primer is cap-sensitive, and at the Mays operation the entire shot is laced with detonating fuse with a 17-ms delay connector between the two rows of holes.

The drill is equipped with a 490-cfm Davey X-400 compressor and a GMC 471 diesel engine. Drill rods are 15 ft long and the kelly is 18½ ft long, making it possible to drill the 25-ft holes by adding a single rod.

Stripping units owned by the Mays Coal Co. are two 6-yd Manitowoc 4500 draglines, and loading shovels are two 4-yd Manitowoc 3500 shovels. The story of Mays' growth against an increasing stripping ratio is told in these units. The Manitowoc 3500's were the company's first stripping units in earlier days when true contour stripping near the outcrop was the rule. As thicker cover was encountered on follow-up cuts the company brought in the 4500's. And now a 12-yd dragline is soon to arrive on the scene. In each instance the bigger stripping unit starts to work where the smaller ones had reached their effective limits.

The result is that the company's operations include several loading and stripping sites several miles apart. The need for a mobile overburden drill is apparent. It can travel to any job on short notice. The end result is that the company's recoverable reserves have been materially increased through the combined effect of higher-capacity stripping units and flexible overburden-preparation equipment.

The Coal Commentator

Confidence-Victory

Unqualified confidence in a "Bright future for black diamonds" has been expressed by one of the Nation's biggest and most highly respected banks. In a full-page, color ad appearing in recent issues of several leading business magazines, The First National City Bank of New York says (in part):

"As coal begins to reshape its destiny, large commercial banks like The First National City Bank of New York will be called upon to play an increasingly important role. First National City bankers are prepared to set up individually tailored financing arrangements to help operators purchase labor-saving equipment and develop mine properties. In addition, First National City can help find new outlets for coal products in this country and overseas through its world-wide branch and correspondent banking system.

"And as coal companies realign corporate and financial structures to improve efficiency and competitive position in the solid-fuel market (so clearly marked for expansion), First National City bankers will continue to provide financial help and counsel."

The FNCB ad typifies the mushrooming interest by investment and banking circles in coal's sound future. The industry has won this interest and confidence by the remarkable production record of 1955 which continues at an increasing rate during the current year. The confidence-victory is an indispensable asset to planning programs and the full realization of coal's destiny.

Plantin' Time

Green thumbs at the Ohio Reclamation Association headquarters, Cadiz, Ohio, are itching to start the biggest strip-land planting ever undertaken in one season.

The association—made up of Ohio surface mining operators—plans to set out over 3 million trees before the middle of May, and to seed 1,000 acres with grasses and forage crops. The season's total planting agenda should cover some 4,500 acres for 52 different surface mining operators.

Preparations for such a large-scale planting are enormous. Strip mine land must be analyzed to determine the growth to which it is best suited. Grading goes on throughout the year. Completed grading and approval of planting plans is required by Ohio law before planting can be done.

Reclamation of strip mine lands in Ohio "is

carried on with the same careful planning and attention to detail as other big business," according to Larry Cook, ORA's executive vice president and director. "Each planting will follow precisely the plan made for it, and accurate daily records will be kept of the progress made. These are the future forests, grazing lands and recreation areas of Ohio."

More and more, the reclamation of exhausted strip lands is becoming a vital follow-through effort for surface operators. When the job is undertaken with the vigor, enthusiasm and business-like approach of the ORA effort, the drive to 100% reclamation—once a visionary's dream—takes a seven-league stride toward practical achievement.

British Energy Gap

"Henceforth, we shall have to import an appreciable and increasingly large part of our (fuel) supplies, or give up the race and be content to decline into a second-rate Power. This is, without any mistake, the point of no return in our affairs."

Thus, quite dramatically, Mr. H. Cunliffe, general manager, Industrial Fuels, Shell-Mex and B. P. Ltd., crystallized his solution to meeting Great Britain's long-range energy gap. Even if 45 million tons of coal-equivalent energy is supplied from nuclear power by 1975, he says the energy gap will be 50 to 60 million tons in 1960 and 120 million tons in 1975.

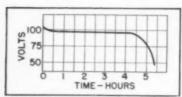
Mr. Cunliffe proposes greater imports of oil because oil requires less shipping space than coal and its cheaper landed cost at present would conserve gold and dollar earnings. For oils that might displace coal, i. e., distillate fuel oils, imports would have to jump 23% annually for each of the next 5 yr, or be 14 million tons of coal-equivalent greater in 1960 than in 1955.

Your commentator wonders if Mr. Cunliffe has not based his proposal too much on the present landed cost of imported oil which he acknowledges can only go upwards. Also, he apparently overlooks the big long-range potential for reduced mining costs in this country—now the major supplier of imported coal to Britain.

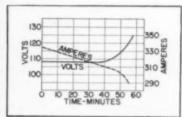
In the upshot, U. S. coal exporters might keep a close eye on the British energy situation. Shipments to Great Britain might remain permanently large (about 5 million tons in 1955) as it is conceivable that the price curves for the landed cost of imported coal and oil could cross in the years ahead. Meanwhile, cost will continue to deter large-scale coal-to-oil conversion.



NICKEL-CADMIUM BATTERY may be charged during lunch period or between shifts without removing it from car, getting an equalizing charge on weekends.



VOLTAGE CHARACTERISTIC at constant discharge rate of 60 amp.



VOLTAGE AND CURRENT CHARAC-TERISTICS in full quick charge.

Shuttle-Car Power in Quick-Charge Battery

IMPROVED SHUTTLE-CAR PER-FORMANCE at lower power cost for battery-powered units is the major benefit seen in the application of nickel-cadmium batteries, some of which have been in service since early 1955 at a large West Virginia mine. The new sinter-plate battery consists of negative plates of cadmium, positive plates of nickel oxide and an electrolyte of potassium hydroxide.

The battery is of the type used in guided missiles like the "Nike" and "Corporal," where space for all components, including power-supply units, is at a premium. To meet this requirement for adequate power in less space, the nickel-cadmium battery plates are made by fusing powdered metal at high temperature, thus providing a porous structure which admits the electrolyte to the innermost portions of the plate. Sintered construction also eliminates the need for mechanical retention of active material. Plates are separated by thin fabric-and-plastic separators, shortening the distance electrons must travel in solution and eliminating considerable interference with their movement.

This type battery is used in two of a fleet of 36 shuttle cars. They are received at the mine with electrolyte already added, ready for charging and installation in the cars. The 300-amphr units are capable of accepting a quick charge without being damaged, and are used in work done by other types of batteries rated at from 360 to 430 amp-hr.

The nickel-cadmium battery receives a 30-min shift at the end of the first shift and another short charge during the lunch period of the second shift. A full charge is applied at the end of the second shift. The battery may be operated on three shifts by quick-charging during shift changes and lunch periods and applying an equalizing charge on weekends. The equalizing charge assures that all cells are in fully-charged condition.

Constant-voltage charging from a 270-v, DC, line is used. A resistor in series with the battery limits the initial charging rate to 350 amp, this charging rate tapering off as battery voltage rises. Charging ends automatically when battery voltage reaches 124 v. Although the battery is charged to this higher level it is actually rated at 100 v, since it consists of 80 cells rated at 1.25 v each. However, in quick-charging, the charge is not terminated until cell voltage rises to 1.55 v to be certain that all active material

is converted to fully-charge condition. The equalizing charge is applied at a 30 amp rate for a period of 5 hr.

One battery per car is sufficient because it is not necessary to remove the battery from the car for charging. Basic maintenance consists of checking the level of the electrolyte periodically and cleaning or dusting the battery as required. There is no "gassing" in this type of battery, so water is added only at infrequent intervals. Furthermore, it does not require attention during non-operating periods and may remain in any condition of charge or discharge indefinitely without damage to the battery.

Operating costs are expected to be lower because the sintered-plate construction makes possible the delivery of full ampere-hour capacity at steady high voltage throughout the discharge period. Also, the voltage drop caused by the surge of starting current to the motor is relatively small, leading to a possible increase in the life of the motor. The battery weighs from 400 to 500 lb less than conventional types, somewhat reducing the power required to move the car.

First cost of the nickel-cadmium unit is higher, but the guarantee is based upon 10-yr life and actual expectancy is a life of 15 yr or more.

Development work was done by Sonotone Corp., Elmsford, N. Y., following preliminary work by the Germans which was made available to U. S. manufacturers by the federal government after the close of World War II.

Selecting Your Trademark

By MILTON E. ABRAMSON

THE AUTHOR is an examiner of trademarks in the United States Patent Office and a member of the District of Columbia bar. The views expressed in the article which follows are the author's own. Though effort has been made to accurately express the view of the Patent Office, it should be understood that the Patent Office neither approves nor disapproves what is stated.

MORE AND MORE, coal is being sold by brand name in the United States. The custom started many years ago in the anthracite fields and moved rapidly to other regions. It is estimated that 2,200 brand names or trademarks are now in use by all segments of the industry. The number of well-known marks, however, is comparatively small. Widespread coal deposits, prohibitive freight rates and simple geography discourage nationwide use of any single brand of coal. However, several good coal brands have been nurtured to leadership by careful marketing.

One of the first steps in the marketing plan of any company-in or out of the coal industry-is the choice of its trademark. For obvious reasons it is necessary to exercise great care in the selection of a trademark. When a mark is finally adopted good hard cash is spent to advertise it. Bags, invoices, order blanks and stationery are printed prominently displaying it. painters are employed to apply it to the colliery, plant and office. Often the sole message on coal barges and trucks is the trademark. All in all a good deal of time, effort and money is invested to encourage customer acceptance of the new mark. And it is time and effort and money well spent since the trademark very often is the only way a satisfied customer identifies your coal when re-ordering.

On the other hand, the haphazard

choice of a trademark can lead to disappointment. The mark can be ineffective in operation or lost by court order. In either event the money and the time and the effort to encourage customer recognition of the mark can never be retrieved. Yet such disappointment can be largely avoided. An attempt will be made here to state some of the dangers which exist and how to avoid them.

WHAT A TRADEMARK IS

First, let's make sure we know what a trademark is. A trademark is a word or symbol used by a dealer in goods to identify those goods and to distinguish them from those of his competitor. It is not a patent which secures to an inventor the exclusive right to make, use and sell an invention. Nor is it a copyright which secures to authors, composers, artists and others the exclusive right to publish and dispose of their works. The trademark is a merchandising shortcut by which a purchaser identifies a product.

To you, a business man, the most important function of a trademark is to distinguish your goods from the goods of your competitors. Therefore, when you select your mark it must not be confusingly similar to any mark used by your competitors on the same or similar kinds of goods. It you do choose a mark which is similar or identical to your competitor's mark, it is not only possible that your customers will buy your competitor's coal by mistake but you may be sued as an infringer. In addition to a possible award of money damages your competitor can stop your use of the mark. To add to the injury he may also reap the benefit of your advertisement of the brand name. Be sure, when you finally choose your mark, that it can mean only your goods and no other.

BE EXCLUSIVE

Before you finally decide to adopt a mark search the recesses of your memory. Did you ever see the mark or anything like it in the trade literature or advertisements of competitors which you have read? It may also be a good idea to investigate marks used on competing oil since at least one court found that a mark used on coal which was similar to one used on competing oil was an infringement. If you do not recollect a mark similar to the one you intend to adopt go a little further and search the trademarks records of the United States Patent Office in Washington. If you can't get to Washington you can retain the services of an experienced attorney who specializes in the law of trademarks to make the search for you. Remember, the law places the burden on you to avoid the use of a trademark which is identical or confusingly similar to one previously chosen by

your competitor.

Choosing a mark which is confusingly similar to one used by your competitors is only one of the dangers involved in the selection of a mark. There are other pitfalls to avoid. For instance, a word which is merely descriptive of coal should not be adopted as the sole or principal feature of your mark. Descriptive words may specify the purpose of the coal such as "smithing," "by-product" and "gas house." Or it may describe some character of the coal such as "black," "ash," "burn," "fire," and "blaze." Similarly, caution must be taken when choosing a mark which is geographically descriptive. Such marks include the names of seams, coal districts and the more important coal-producing states. These descriptive and geographical words cannot be appropriated by any one producer to the exclusion of others. All operators and dealers have a right to describe their coal in the usual language and identify the place where it was mined. However, all these words may be used together with another valid trademark.

Under certain conditions descriptive words and geographical designations can become distinctive of your coal and they will be protected by the courts. The process whereby a trademark becomes distinctive is clothed in legal technicality and discussion on this point would be too lengthy for inclusion here. But be mindful! Unless you are sure you understand these points of trademark law you will be wise to secure expert opinion before you adopt such marks.

PROBLEMS WITH SURNAMES

Surnames as trademarks-even your own-offer problems too. On the theory that others are entitled to use their own names, the courts often give limited or no protection in suits for infringement of this kind of mark. Yet some of the most famous American trademarks are surnames. Who is not familiar with Johnson's wax, Smith Brothers cough drops and Campbell's soups? These names have become so well-known on the products on which they are used that they acquired a secondary meaning in commerce; that is, they have become distinctive of the goods to which they are applied. Once a mark has become distinctive it merits complete protection by the courts. But before you adopt a sur-name as a trademark be sure you are willing to wait until the name has become so well-known that there can be little doubt that it refers only to your coal. At that time you can stop others from using the same name as a trademark-even those whose own surnames are identical to your mark. But you will not be able to stop anybody from using his similar or identical name in the usual course of business.

USE YOUR TRADEMARK

In English-speaking countries a word or symbol cannot be protected as a trademark until it has been used as a trademark. Merely intending to use a mark or using it in a manner which is not recognized as trademark use gives you no rights which the courts will protect.

The trademark laws require the mark to be used on or in connection with your goods. On the rare occasion that coal is sold in a container the mark should be prominently displayed on the container. However, in the usual course of business coal is distributed in loose bulk. The scatter tag has become the accepted method of affixing the mark to the goods. This tag is a thin cardboard disc which is roughly the size of a milk bottle cover. The trademark, often together with a laudatory blurb, is prominently printed on the tag. The tags are then scattered throughout the bulk coal in

a predetermined proportion. Sufficient tags should be scattered so that at least one or two can always be seen when the coal is delivered to the customer. For years the Patent Office has accepted these tags as evidence of trademark use. It is presumed that the courts will also accept them.

COLORED COAL

Several companies have applied to their bulk coal a paint splash or splatter which they intend to function as a trademark. Others have completely colored lumps of coal and scattered the painted lumps through the mass of coal. Both of these methods have been accepted as trademark use by the Patent Office. It is believed that this affixation of the trademark will also be accepted by the courts as evidence of trademark use.

The paint splatter and the painted lump types of marks serve a purpose. They are visual trademarks and assure the purchaser that the coal he bought originated at the same source as his previous purchase. However, it is suggested that a word mark also be used. The word mark should be tied to the color mark, if possible. The word mark will facilitate ordering your coal. It is easier for your customer to pick up the phone and order five tons of Sky Pink coal than try to identify the color or splatter of pieces of coal distributed through the mass. The visual and auditory marks can work together effectively.

Trademarks are also used on trucks and barges. This use of your mark should be a supplementary one. Your mark on truck sides and tailgates certainly advertises it but in at least one court suit the use of a mark on delivery trucks has been held to be inadequate use. And finally, printing the mark on letterheads, order blanks, invoices and advertisements in newspapers has been definitely rejected as evidence of the requisite trademark use. These latter uses will bolster your claim to the mark but it is not trademark use on or in connection with the coal. The mark must be used on or physically in connection with the coal when it is moved in commerce and delivered to the purchaser. It must be affixed so that the purchaser can see it and it must be presented so that there can be no doubt that it is the

trademark for the coal.

TRADEMARK REGISTRATION

When you have selected your trademark and properly used it you should consider the desirability of registering it with the appropriate state agency or if you are using the mark in interstate commerce or other commerce which is controlled by Congress you can register it in the United States Patent Office. Benefits received through state registration vary greatly among the states and should be investigated in the state in which you do business. If your mark qualifies for registration in the Patent Office you can secure several important benefits under the provisions of the Lanham Act of 1946 which makes the protection of your trademark considerably

Practically all larger producers and many smaller ones avail themselves of the rights and benefits provided in the Lanham Act by registering their marks in the Patent Office. However, before a mark is registered in the Patent Office it is examined much in the same manner that a court would examine it if its validity were challenged. If the mark meets the exacting requirements of the law, it is registered. In most cases, the courts must accept the registration as evidence of your ownership of the mark and your exclusive right to use the mark. Under certain circumstances it may become conclusive evidence of the right to use the mark and the mark may thereby become incontestable. Registrants are also entitled to rights and remedies for protection against infringement and unfair competition. And, finally, registration can also be constructive notice of your ownership of the mark.

FOREWARNED-FOREARMED

The many conditions and possible dangers involved in the selection of a trademark may seem burdensome and cumbersome. However, to be forewarned is to be forearmed. Careful consideration of the dangers and "taboos" to which reference has been made will result in the selection of a strong and valid trademark to which the courts will give the greatest protection. And the good will you strived so hard to build into your mark will pay off when customers confidently order your coal by the trademark you have carefully chosen and developed.

The 50 Biggest Mines in 1955

THE NATION'S 50 LEADING MINES, all in the bituminous industry, produced 88,902,924 tons in 1955 or 19.1% of the estimated bituminous total, according to this annual study prepared by J. R. Forsythe, general manager, *Keystone Coal* Buyers Manual, a Coal Age affiliate. Their 1955 output exceeds the 73,439,443 tons or 18.7% of the total produced by the 50 largest in 1954. During 1955, 85 mines produced over 1,000,000 tons each, against 49 in 1954.

	COMPANY	NAME OF MINE	STATE	1955	PRODUCTION 1954	1945
1.		*Robena (c)	Pa.	4.914.741	4.102,938	1,557,778 (1)
2.		*Peabody No. 10	III.	3,628,121	2,645,923	New, 1952
3.	Pocahontas Fuel Co., Inc.		W. Va.	2,702,564	2.144.046	New, 1949
4			III.	2,534,815	1.980,719	New, 1949
5	Peabody Coal Co.		Va.	2,501,339	2,178,595	New, 1947
6.	Clinchfield Coal Corp.		Pa.	2,482,058	2,178,393	59,992 (2)
7.	Mathies Coal Co Jones & Laughlin Steel Corp.		Pa.	2,473,502	2,034,877	1.243.825
8	Hanna Coal Co.		Ohio	2,412,496	1,954,232	1,942,055
g.			Ky. W.	2,307,559	1,952,064	456.337 (3)
0.	Homestead Coal Co		W. Va.	2,088,485	1,599,789	New, 1946
1.	Bethlehem Mines Corp.		W. Va.	2.085,992	1,947,894	1,173,915
2.	Jones & Laughlin Steel Corp.		Pa.	2,083,992	1,916,512	1,423,512
3.					1,910,512	1,243,800
	Pocahontas Fuel Co., Inc		W. Va.	1,968,089		1,711,444
14.	U. S. Steel Corp		W. Va.	1,952,486	1,581,272	New, 1951
15.	U. S. Steel Corp.		Ky. E.	1,914,982	1,774,582	New, 1951
16.	Freeman Coal Mining Corp		III.	1,723,975	1,600,718	
	Dye Corp		W. Va.	1,695,143	924,075	1,329,208
8.	Christopher Coal Co	Arkwright No. 1	W. Va.	1,651,799	1,376,133	547,550 (4)
	U. S. Steel Corp.	*Concord (c)	Ala.	1,626,971	1,151,274	New, 1947
20.	Old Ben Coal Corp	No. 9	III.	1,625,626	1,433,520	162,006 (5)
21.	Island Creek Coal Co.		W. Va.	1,623,005	848,087	1,410,078
22.	Freeman Coal Mining Corp	*Orient No. 3	III.	1,582,907	1,579,296	New, 1950
23.	Hanna Coal Co		Ohio	1,579,492	1,320,791	343,801 (6)
24.	Eastern Gas & Fuel Assoc		W. Va.	1,566,766	1,738,038	1,692,509
25.	Christopher Coal Co	Osage No. 3	W. Va.	1,560,266	1,289,798	996,949
26.	Emerald Coal & Coke Co	760	Pa.	1,557,874	706,516	272,677
27.	Rochester & Pittsburgh Coal Co		Pa.	1,552,580	1,197,152	1,200,003
. 85	Inland Steel Co		Ky. E.	1,529,057	1.433,130	1,430,000 (7)
9	Truax-Traer Coal Co		III.	1,510,991	1.277,123	1,349,521
30.	Powellton Coal Co.		W. Va.	1,487,985	1,038,791	610,000
1.	Powhatan Mining Co		Ohio	1,467,610	899,080	847,934
2.	Eastern Gas & Fuel Assoc		W. Va.	1,460,337	1.112.504	1,218,086
3.	Consolidation Coal Co		W. Va.	1,451,214	1,004,371	1,191,348
4.	Christopher Coal Co		W. Va.	1,441,177	965,187	465,770
5.	Amherst Coal Co		W. Va.	1,413,589	810,683	New, 1950
16.	Powhatan Mining Co		Ohio	1,410,536	1,179,835	942,142 (8)
17.	Bethlehem Mines Corp		W. Va.	1,399,647	1,248,061	1,802,669
8.	Duquesne Light Co		Pa.	1,397,121	1,246,285	861,930
9.	Nashville Coal Co		Ky. W.	1,385,476	920,273 (9)	New, 1952 (9)
0.	Island Creek Coal Co		W. Va.	1,356,980	812,389	813,646
1.	Buckeye Coal Co		Pa.	1,331,361	963,121	2,102,678
2.	Pocahontas Fuel Co		W. Va.	1,324,167	1,004,422	1,242,924
3.	Alabama Power Co		Ala.	1,318,584	992,038	274,512
4.	West Kentucky Coal Co		Ky. W.	1,305,283	1,200,323	New, 1949
5.	Compass Coal Co		W. Va.	1,299,335	1,239,009	New, 1949
6.	Youghiogheny & Ohio Coal Co		Ohio	1,275,168	964.891	901,202
7.	Freeman Coal Mining Corp		III.	1,258,663	974,758	2.991.939
8.	Nashville Coal Co		Ky. W.	1,258,003	1,172,680 (10)	New, 1949
9.	Omar Mining Co.		W. Va.	1,256,662	1,014,851 (11)	746,624 (11
0.	Consolidation Coal Co.		W. Va.	1,246,651	1,196,944	New, 1947
	TOTAL OUTPUT, 50 Mines			88,930,250	71,152,278	38,560,428

SYMBOLS: (c) Captive mines. (s) Strip mines. (ps) Part strip. *New mines since 1945. (1) Ronco-Robena Mines, Robena under Development. (2) Pittsburgh Coal Co. (3) Deep mine—now exhausted. (4) Consolidation Coal Co. (5) Mine under Development, opened in 1945. (6) Bradford

Collieries Corp. (7) Wheelwright Mine—now part of Price. (8) Rail & River Coal Co. (9) Uniontown Coal Mining Co. (10) Miners Coal Co. (11) West Virginia Coal & Coke Corp.



Modern Mining Man:

YOUR POSITION in a highly mechanized industry—no stranger to automatic controls—makes you a vital cog on the American industrial team.

Your Profession . . . Six reasons for growing with it:

- 1. You work in a basic industry.
- 2. You work in an industry of high pay and liberal fringe benefits.
- 3. You work under pleasant living conditions.

- 4. You work in an industry with a future.
- 5. You work in a modernized industry.
- 6. You work in an industry of challenge and opportunity.





NEAT RESIDENTIAL AREAS have become the hallmark of modern coal mining communities. Typical miners' homes above and left could measure up to their finest counterparts in any other American occupation.

1. You work in a basic industry.

Electric power and steel are the backbone of the Nation's economy. Coal supplies about 70% of the fossil-fuel energy for producing electricity. Virtually no substitute has yet been found for coke in steelmaking. Other industries depending heavily on coal include those producing chemicals, pharmaceuticals, aluminum, cement and atomic energy.

2. You work in an industry of high pay and liberal fringe

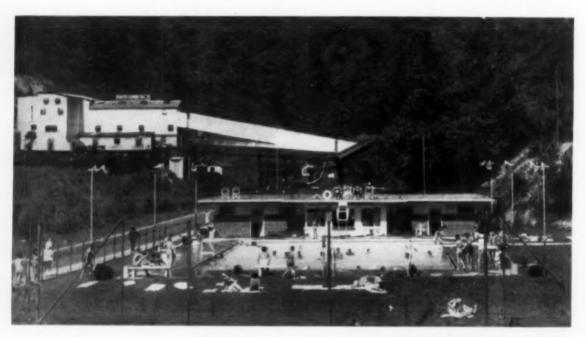
benefits. The hourly wage for miners is the highest in any basic industry. Management pay, though more variable by region and size of operation, is good, too. Young engineers are being sought at competitive industry pay scales.

3. You work under pleasant

living conditions. Modern mining camps and communities reflect company concern for the "off-the-job" welfare of employees. These communities provide neat living quarters, modern schools, inspiring church edifices, a variety of recreational opportunities, and adequate medical facilities.

4. You work in an industry with

a future. In 1955, coal output hit 470 million tons, up 20% over 1954 (by comparison, oil and natural gas each rose only 8%). Production the first 2 mo of this year was 13 million tons ahead of the same period in 1955. Output should reach 600 million tons by 1960 and 750 million tons by 1965.



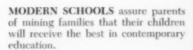
UNIQUE LOCATION of swimming pool, under the very shadow of a preparation plant, shows the increasing emphasis companies are putting on recreational facilities. Golf courses and playgrounds are quite common.



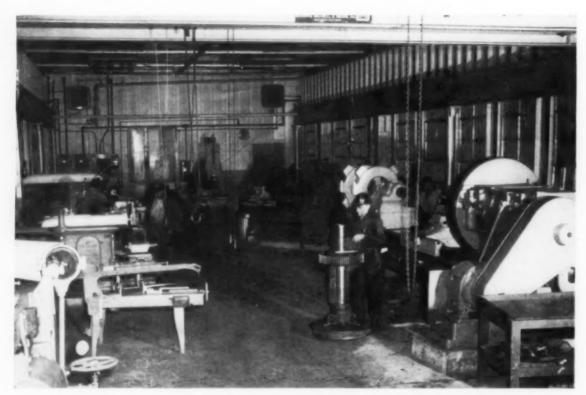
SPECIAL EFFORT is made to provide young engineers with comfortable living quarters—frequently in a club-house as at left.



A CHAPEL in the hills fulfills a mining community's quest for spiritual guidance and satisfaction.







5. You work in a modernized in-

dustry. During the 20 yr period, 1934-53, the more effective use of men and machines almost doubled output per man day from 4.40 tons to 8.17 tons; by 1955 the figure rose to about 10 tons. The target for 1960 is to average 16 tons—an output level already reached or exceeded by some top producers.

SKILLED TECHNICIANS operate and maintain the machinery and equipment that run today's mines. To realize coal's future, their work must be complemented by young engineers who have the ability and imagination to extend the art of mining, processing and transporting coal.







THE COMPANY SERVICE CENTER, building-wise, is a far cry from the "cracker-barrel, pot-bellied stove" type of general store of bygone years. But the same spirit of friendliness remains.

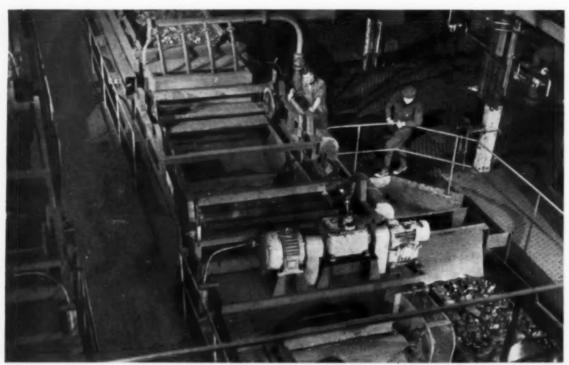


THE CLEAN LINES and simple design of this three-story office building reflect the company's effort to blend administration unobtrusively with community planning.

BETTER EQUIPMENT brought rapid growth in strip mining—now 25 to 30% of total production. But deeper overburden has increased the need for improved methods of drilling, blasting and haulage.

6. You work in an industry of challenge and opportunity. To meet increasing demands for coal, management must devise ways to replace exhausted mines and to add 110 million tons of new capacity by 1960. A great need exists for new ideas to improve merchandising and safety (mainly roof control), to develop cheaper methods of transport, and to extend uses. Only the surface potential has been scratched for reducing mining costs through continuous mining.





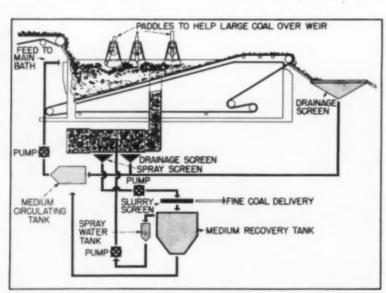
FLEXIBILITY and spaciousness are features in the 800-tph plant, Automatic control insures proper specific gravity,

Dense-Medium Cleaning in

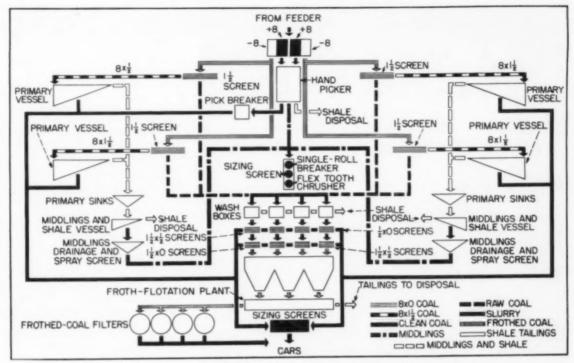
By LEO WALTER Consulting Engineer Cheltenham, Glos., England ONE OF THE LARGEST coal cleaning plants in the world, and the largest at present operating in Great Britain, has recently been built at Lynemouth, Northumberland. This is part of a \$7,000,000 reconstruction program at the Lynemouth and Newbiggin collieries and has a maximum capacity of 800 tph. The highly efficient central plant handles the entire output of three neighboring collieries.

The plant includes the Ridley-Scholes process (British licencees Mitchell Engineering Group Ltd., London) which uses a specially prepared liquid or medium, that moves along a shallow tank. The bottom of the tank is fitted to a moving belt which collects and carries away the dirt as it is separated from the clean coal. A second tank can be used if it is desired to make a middlings product. Automatic density-control equipment ensures that the returned medium has the proper specific gravity. A secondary gravity recorder produces chart records. For easily washable coal the Baum washer is used in British coal mines, but dense-medium processes are preferable for certain difficult conditions.

A special feature of the plant is its spaciousness and layout. It is made up of four self-contained units which can be operated as desired with one, two,



PRIMARY WASHING at a specific gravity of 1.4 is done in four units like this.



HOW COAL FLOWS and liquid circulates in the coarse-coal section of the plant.

Great Britain's Largest Plant

three or four machines, depending on the rate of feed. At the same time no space is wasted and the coal flows straight through from the surge bin to the screening plant.

COARSE-COAL CLEANING

From the washery surge bin the R-O-M coal is delivered by two vibrating feeders to conveyors that carry it to the preparation plant. Two disc magnets are suspended over each of these conveyors to remove tramp iron which would otherwise cause damage to the plant.

The raw coal is discharged onto two scalping screens which separate it at 8 in and deliver the plus 8-in coal to the hand-picking belt. The hand-picked shale is delivered by chutes to the refuse conveyor for ultimate disposal. The plus 8-in coal left on the belt is passed to the main clean-coal belt for delivery to the sizing plant. Any middlings from the picking belt are sent to a roll breaker which reduces them to approximately 1½ in. They are then sized on a vibrating screen, recrushed if necessary in a flextooth crusher, and are finally passed to the fine-coal washing plant.

The minus 8-in coal passing through the scalping screens is delivered to four screens separating at approximately 1½ in. The oversize passes to the Ridley-Scholes vessels and the undersize passes to the fine-coal washer.

THE RIDLEY-SCHOLES VESSELS

Since separate middlings extraction is required, there are two sets of Ridley-Scholes units at Lynemouth. The four primary washers operate at a specific gravity of 1.4 and float off the best coal which passes onto the drainage and spraying screens. Here the medium is drained and washed off, first by sprays using partially cleaned water, and second by fresh water sprays. After this the coal, now thoroughly cleaned of both dirt and medium, goes to the sizing plant.

Meanwhile the sink products from the primary baths pass over similar drainage screens and are retreated in the secondary or middlings washer operating at a specific gravity of 1.6 to 1.7. The middlings from these are in turn drained and washed and are sent to the middlings crushing and screening equipment.

PREPARING THE MEDIUM

The ground floor of the plant has storage space for 500 tons of fresh magnetite for preparing new medium. The magnetite is fed, as needed, to boxes from which it is discharged to classifiers. The rate of delivery to the classifiers is controlled by vibrating feeders.

The magnetite below 200 mesh overflows from the classifiers to a pumping box and is delivered to a thickener. The magnetite above 200 mesh is carried by the classifier rakes to the feed trough of the ball mills which grind it to the required size. The grinding equipment is arranged to provide a continuous system.

RECOVERING THE MEDIUM

The dense medium overflowing from the Ridley-Scholes units and collected from the drainage screens passes to surge tanks from which it is pumped back to the feed inlets distributed over the areas of the deep ends of the washers. Thus uniform longitudinal flow in the units is maintained to promote the best separating conditions. The surge tanks are large



INCOMING coal is made up of a blend of products from three mines, Feed flows straight through from surge bin to the dewatering and sizing plant.

enough to hold the entire contents of the vessels plus a working reserve so that the vessels can be instantaneously emptied for inspection.

The dilute medium recovered from the spraying screens is pumped to the slurry screens, which remove any coarse particles. The underflow goes to the two thickeners immediately beneath the screens where the magnetite settles rapidly. The thickened magnetite is then recovered by special oscillating ball-valve mechanisms, which operate under the control of the automatic density equipment, while the overflow passes to the spray tanks feeding the primary sprays on the screens.

A bleed off is taken from the spray tank to maintain a constant condition of this water and is passed to the slurry tanks of the fine-coal washer.

FINE-COAL WASHING

The minus 1½-in coal is collected from the surge hoppers by conveyors, which also receive the crushed middlings, and is delivered to four finecoal automatic Baum jigs.

The washed coal from these jigs is then screened at 1/2 in. The plus 1/2-in coal is sent to join the washed coarse coal from the Ridley-Scholes units on its way to the sizing plant. The minus ½-in product, together with the wash water, is delivered to four dewatering screens with 1/2-mm screens. Underflow passes to the settling tanks. From here the settled slurry is delivered to the froth-flotation plant, while the clarified water is pumped back to the washery. All the refuse from the Baum jigs is handled by elevators and is finally discharged to the main refuse conveyor.

SLURRY TREATMENT

The settled slurry from the settling tanks is pumped to the head boxes of the froth-flotation plant which feed it to the conditioning tanks. The conditioned slurry is then fed to the two banks of flotation cells. Frothed coal from these cells is re-treated in two further banks of cells and delivered to the four rotary vacuum filters for dewatering.

The tailings from the flotation cells

are delivered with the wash water to the water clarification plant for further treatment and ultimate disposal in the nearby sea.

SECOND PLANT USES TWO UNITS

A new plant with a similar application of dense-medium vessels can handle 220 tph of coal at a Kent colliery.

The two 90-tph Ridley-Scholes dense-medium units operate, as at Lynemouth, with a magnetite medium which is recovered by gravitational thickening and purification in settling cones equipped with automatic-density controls.

The dense-medium baths treat 6x%6 coal and it is necessary to remove the fine coal before washing. Since the raw coal is slightly damp, this is a difficult operation and is successfully accomplished by an extensive installation of modern high-speed screens. The fines are marketed as a raw product.

HOW COAL FLOWS

The R-O-M coal is received direct from the mine dump and is roughly screened at 6 in, the oversize being passed through two pick breakers and reduced to 6x0. The recombined stream is then fed to a distribution hopper at the head of the plant which is designed to spill over automatically into a surge bin when peak loads occur, so that the excess coal can be stored for treatment later. This enables a steady load to be maintained on the washery and avoids the amount of breakage which would occur if all the coal were passed through the bunker.

From the distribution hopper the coal is transferred by four feeders to four Nordberg rod-deck vibrating screens which remove the minus ¾6-in fine coal. It flows onto a second set of screens for removal of any remaining fines. All the fines collected from these screens are then delivered to the loading points while the larger coal passes on to the Ridley-Scholes washers.

The washed coal is drained and sprayed, which gives it a bright, clean appearance, for sizing into market products and loading. Meanwhile the dirt is similarly treated and is conveyed by belts to the main refuse conveyor which carries all the refuse from the tipplers to a disposal point.

The dense-medium preparation and recovery system is somewhat similar to that at Lynemouth. Since there is no fine-coal washer at Chislet the bleed taken from the spray tank, for example, goes direct to a Unifloc water clarification system from which the clarified water is returned to the washery system. The plant thus operates on a closed water circuit.

Planning Rules and Regulations

A 10-point guide for coal-mining officials on formulating rules

By ERNEST W. FAIR Boulder, Colo.

RULES AND REGULATIONS need care and planning just as any other phase of coal operation. Setting the guides up carefully assures us that the purpose for which these rules are being established will be accomplished. Going about it without planning can mean trouble with employees, sloppy enforcement and, where matters of policy may be concerned, erroneous interpretations by members of the staff.

Experience shows that several factors must be carefully considered each time a rule or regulation is drafted by the executive if he is to get maximum results. They form a basic skeleton around which to build every rule or set of rules we may need to perfect the smooth organization needed in our firms. The 10 points are:

- 1 The statement of any policy or rule should be definite, positive and clear to everyone. This calls for presenting the regulation in the simplest and most direct manner possible and in the fewest number of words we can put together to do the job. A long and involved statement leaves everyone groggy. The more we write on the point the more open to misunderstanding it becomes. Nor should there be any possibility for indecision on the part of anyone with regard to the subject matter presented.
- 2 Where the rule or regulation sets up a policy for the entire organization it should be of such a nature as to readily apply in the practices and peculiarities of each department.

Each such regulation should be examined for its application in every individual department and not formulated, as is so often done, with just

one section in mind.

Where allowances are made for such varying conditions then the rule or regulation will not only be easier to apply but it will be drafted in such form as to be readily understood.

3 No rule or regulation should ever be inflexible, but they must possess a degree of understood permanency. The respect given such rules and regulations will be in direct proportion to the individual's belief in the permanency of the rule.

'Shucks they're going to change that next week-why pay any attention to it today," is one reaction. If the desired ends are to be attained there can never be anything in a rule or regulation which will arouse such a feeling in the mind of any employee.

The wording or method of presentation should also remove any doubt as to the seriousness with which the rule or regulation will be administered. Often that frame of mind is established by how closely executives themselves follow new rules and regula-

4 Stability is an absolute essential; constant change makes any rule or regulation valueless. Rules and regulations should never be established on the spur of the moment or without careful planning, for such policies almost invariably require a number of changes. As each change is made total respect for the rules and regulations on the part of employees will vanish.

Any rule or regulation we set up must be thought out and discussed at length before being established to avoid this very factor. "Kinks" therein are much better worked out during this planning period than through actual practice, which will require change after change and lack of respect.

5 Keep the rules and regulations as few in number as possible. There should be as many points as necessary to cover conditions that can be anticipated but not so many as to make the whole thing confusing or meaningless.

The best followed rules are those presented in the fewest number of sentences. It is far better to present a basic rule in this manner and supplement details verbally than to try to write everything into the code itself; doing so taxes the memory of any employee to handle the policy as a whole.

By nature we all hate rules and regulations anyway. We actually rebel against long, involved ones.

6 No rule or regulation should ever be established on a basis of personal reflections or during an emotional period. Fact and sound judgment are the corner stones of a very good rule and regulation in any organization.

None of us can trust even our own thinking processes under emotional strain. Any rules or regulations we devise during such periods are bound to overlook basic facts.

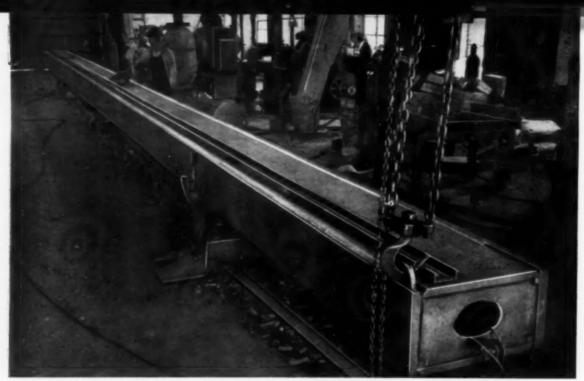
- 7 Look at the "other side" before every rule or regulation is established. We must remember that the other fellow is the one who will have to apply the rule or regulation we are formulating. We have to be certain that he is capable of doing so, we must be sure it will not prove impossible of attainment by the mechanics of his job, we must be certain that it is not a direct imposition on any of his or her rights or privileges. Rules which disregard the other fellow can be enforced, but they never have the full co-operation which assures their success.
- 8 Only in the rarest of instances should a rule or regulation set forth detailed procedure. This should be left to the individual's own thinking processes or to verbal presentation by supervisors.

Where such minute detail is presented iron-bound procedure is established and conditions of variance which may arise will leave many people helpless and bewildered. The broad and basic policy should be es-tablished without doubt, then when the unusual occurs the individual can handle the situation under his own devices in accordance with this basic policy. Detailed spell-out in a regulation obviously makes it long and involved and therefore more difficult to understand, absorb and remember.

9 Every rule and regulation should be studied closely to determine how it will affect previously established rules and regulations before it is posted. Attention should be called to any that it supplants and revisions should be noted.

Making such a check-up beforehand will also eliminate the possibility of hurried changes later when such a conflict is discovered.

10 Make sure every such rule and regulation complies with existing laws of all kinds from local to national level and particularly with those affecting employees. Reasons for this point are obvious.



LONG DIPPER STICK for 35-yd shovel is welded together by submerged-arc equipment guided by steel channel tackwelded to top of stick. Salvaged track rollers from bulldozer are used as trunnions for turning stick.

Semi-automatic submerged-arc welding procedures mean large savings in . . .

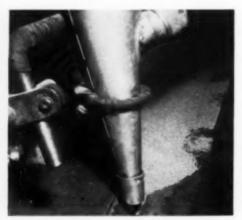
Fabricating Dipper Sticks

THE PROBLEM OF FABRICAT-ING DIPPER STICKS for a 35-cu yd shovel is not an everyday occurrence at most strip-mining operations. Making the 64½-ft-long units would be considered a big job for any shop. However, officials and welders at shops of the Commercial Fuel Co., Columbus, Ohio, headed by Carl

Johnson, general superintendent, recently made two of these dipper sticks in about one-quarter of the time originally estimated for the job by using submerged-arc welding methods and designing a special jig to handle the work. Preliminary estimates for the job were 760 hr for each stick, based upon hand methods. The actual time was 197 hr per stick with automatic welding.

The heart of the physical problem was handling the sticks so that they could be turned for welding the four long seams. To save as much time as possible, the welding process had to be automatic. The less often that





DURING WELDING PASS operator keeps gun filled with special alloy flux in agglomerated form. Six passes are required to fill each joint, and stick is rotated to another side after each pass to permit cooling and to check distortion.



BACKING BARS at corners, made of 1-in square mild steel, provide reinforcement throughout massive dipper stick.



FABRICATED STEEL WHEELS with centers cut out to fit stick make it easy to turn stick with electric hoist.

welding was interrupted for shifting the piece, the greater would be the saving.

Sylvester Jackson, in charge of welding for Commercial Fuel, provided the answer. He fashioned huge steel wheels of 1½-in stock with holes cut in the centers to fit the finished dimensions of the stick. These were welded to the stick as it was formed and furnished a means of rotating the work as it became necessary. To further refine the turning job, track rollers from a D-6 tractor were mounted on the floor beneath the wheels and formed a cradle for the fabricated wheels to turn in. With this system, electric hoists easily turned the bulky stick.

Next step was to arrive at a welding procedure. A field engineer from The Lincoln Electric Co., Cleveland, Ohio, was called in and asked to suggest a welding procedure and to supervise the job. He recommended that a submerged-are process be used to keep labor and overhead costs to a minimum. Semi-automatic equipment was suggested because of its low cost and flexibility for job shop operations. The equipment was adapted for the job by mounting the welding gun on a self-propelled burning buggy to provide practically full-automatic operation on the long welds. High speed, continuous operation reduced welding time to a fraction of what it would have been if manual welding were

used. With the submerged-arc process, full penetration in fusion of the joint is assured and arc distortion is minimized.

Since a low alloy steel, USS T-1, was being used to fabricate the sticks with higher strength and less weight, the properties of the steel had to be matched in the weld metal. To do this, a new development in agglomerated fluxes for submerged are welding was used. Alloy fluxes, each containing one alloving element, chromium, molybdenum, vanadium and nickel, were compounded by the manufacturer to meet the requirements of the application. The specially compounded flux was used with a mild-steel electrode wire. This new method of automatically welding alloy steels with a custom-tailored alloy flux is more economical than buying a special alloy wire in limited quantities.

In this application, the mechanical properties of the plate were matched rather than the chemistry of the plate. The weld metal was alloyed in the arc to develop a yield point and tensile strength with impact properties at low temperatures equal to those of the T-1 plate being used.

Specifications called for the sticks to have a finished length of 64½ ft. They were to be made up of 20-ft lengths of T-1 steel. The bottom plate was 2 in thick, the top 1½ in, and the side panels 1¼ in. Finished outside dimensions were 25½x13½ in.

Backing bars of 1-in square mild steel were used on the inside of each seam for the entire length of the beam to provide additional strength. Before welding, a 45-deg bevel with no land was cut on the 1½-in side plates. The 20-ft plates also were beveled 45 deg at the ends before being joined to make the 64½-ft lengths, with joints cut at a 20-deg angle and staggered. Just before the welding process was started, the plates were heated to 300 F.

Welding was accomplished by setting the self-propelled buggy, carrying the cone carrier, to travel at a speed of 4-5 in per min along the length of the stick.

To avoid interruption of welding, the tops of the turning wheels were cut off and welded back on when they were needed.

It required six passes along the length of the piece to fill the joints, the stick being rotated after each pass to distribute the heat evenly and provide a further check against distortion. On the first pass, a 30-deg angle was used for the welding wire to give 100% penetration into the mild steel backing bar. Coils of %u-in wire (mild steel, L-60) were used.

A stringer-bead procedure was used to eliminate wide beads on the welds, since stringer beads cause proper alloying and give better heat distribution. A stress-relieving temperature of 1,100 F was set by the engineer after welding was finished.

Memo to Coal Age readers from the editors:

How Coal Age produced its March feature . . .

"U. S. Coal Props World Prosperity"

MEASURED in terms of money, time and effort, the feature on U. S. coal exports in our March issue represents a major effort. The 12-page, 10,000-word article is a product of a number of publishing services and skills which had to be marshalled by the author, W. A. Raleigh, Jr., before he could lay the text down in its final form.

Since we spend so much time with you probing into your working methods, we thought you might like to have an inside view of how one of our features is conceived and produced. This is how it all began:

The big surprise in 1955 in the market category was the terrific jump in coal exports. Overseas shipments (excluding Canada) hit 34 million tons last year, compared to 15 million in 1954.

Sensing the thinking in the industry, Ivan Given in his December, 1955, editorial raised the question: "Are bulging exports temporary or permanent?" The question was raised in the light of historical fluctuations in the export market, and it was immediately evident that this was a worthy editorial project. Ivan assigned Bill Raleigh to develop and prepare an article to answer the question, thus enabling coal management to plan its participation in the export market on facts.

To start the project off, a questionnaire was prepared for McGraw-Hill World News correspondents in the 21 biggest markets for our export coal in West Europe, the Far East and South America. The correspondent at Geneva (headquarters of the Economic Commission for Europe) was asked to do an area roundup on West Europe as well as to answer individual questionnaires on those countries. The reports from Geneva were requested to provide a cross-check and to fill in data received direct from the other correspondents in West Europe.

Basic objectives of the questionnaire were to (1) determine the present size of the market for U. S. coal in each of the countries surveyed and (2) estimate as accurately as possible whether the size would increase, decrease or remain about the same over the next 5 to 10 yr. In addition to asking for interpretive copy, the survey also sought a mass of statistical data on (1) each country's coal production, exports, imports and consumption by types of coal and (2) each country's consumption of other fuels in tons of coal equivalent.

The questionnaire was sent out in November and

most of the returns were in by January 15. Now Bill Raleigh tackled the job of pulling the story together, editing and writing it into the 12-page unit you saw last month. He worked a full week on the 5-column chart, "21 Overseas Targets for U. S. Coal" (pp 60-61), organizing, posting and cross-checking about 1,200 entries in the chart.

Then another two weeks, during which the "midnight oil" poured freely, were required to prepare the written copy and other editorial items, with the February 11 deadline for the March issue crowding all the while.

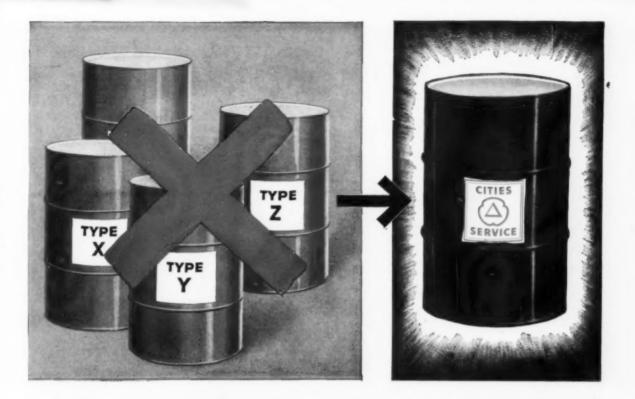
A number of other sources were probed for all that would be needed to build a well-rounded article. The photos of operations at Newport News, the main port for export, were provided by the Chesapeake & Ohio Railway Co. at Bill's request.

Two editorial display boxes were added because of the critical values they would lend to the total picture. One of these, a forecast by the McGraw-Hill Economics Department on the general economic outlook for West Europe (p 57), presented the big picture of business activity in the area, certainly a necessary base for planning entry into the market.

The other display box provided a look at the competition. A last-minute cable to our World News correspondent in Vienna brought some basic data on the coal picture in Poland whose exports now offer the principal competition to U. S. coals in international trade. From these basic data, Bill wrote the second box, "Who Gets the Cream—Poland or the U. S." (p. 59).

Joe Forsythe, general manager, Keystone Coal Buyers Manual, a Coal Age affiliate, came through with good suggestions and comments. The idea for the cover was the subject of a Raleigh-Elias-Zimmerli-Davis session. Al Zimmerli, our editor in charge of art and layout, prepared the original drawing, and the McGraw-Hill illustration department worked up the final version. (Al Flowers was in West Virginia at the time, getting the background and photos for the lead-off article in this issue.)

The word soon got around. Other McGraw-Hill papers heard of our survey and are preparing articles for their own readers on the subject. We had requests for copies of the article from many parts of the country even before the issue was mailed, and requests have grown in number since the issue went out.



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Let Cities Service Multi-Purpose Trojan H Grease, the remarkable new lithium base lubricant, take on the job of practically all your present greases and do a better job than any special grease.

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New Multi-Purpose Trojan H not only has greater stability than previous greases, it also pumps easier at low temperatures, flows easier, and has exceptional resistance to water, oxidation, and rust. Best of all, it lasts longer and tests show it takes *less* to do this superior job of lubrication. Result: You save time, confusion, and money!

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ALERT SUPERVISORS, trained to sense trouble and react quickly, can initiate many improvements.

Industrial Engineering at The Section Level

Making a good section better is the purpose of applying the principles of industrial engineering on the job. Benefits are increased overall efficiency and better working conditions for employees.

INDUSTRIAL ENGINEERING is much more than a staff function of top management. While it is true that the engineering department of your company, acting for top management, takes a vital interest in time studies and is always concerned with the problem of dovetailing equipment and methods, it is also true that the supervisor of a mine or section should be alert in applying the tested principles of industrial engineering in his own mine or section. This can be done without great fanfare and without throwing discord into the even hum of operations, since the ability and willing-

ness to apply these principles is a supervisory state of mind more than anything

Before moving any deeper into the subject, we should define what we mean by industrial engineering. We think it is the technical art (admittedly a homemade term) of combining elements such as machines, manpower and methods to achieve highest productivity at lowest cost. And since men are involved, we can readily see that smooth supervisor-employee relations are mighty important.

With this definition on paper, let's explore the possibilities of applying super-

visory industrial engineering from the standpoints of (1) what can be done, (2) how to go about it and (3) the results you can reasonably expect.

WHAT CAN BE DONE

A well-planned, effectively-supervised mine or section is one where the men are busy but not hurried, the hum of machinery can be heard but not the sound of raised angry voices and coal is moving in the transportation system. These signs of a smooth operation usually are the result of the application of all well-known principles of good mining.

The kind of industrial engineering we speak of is to be applied after these other conditions have been fulfilled. In other words, we want to make a good section better.

Examples of what can be done to improve on good operations can be seen every month in the Operating Ideas department of Coal Age. Referring to that department now (p 86), you see how shuttle-car sideboards have been made



U. S. Royal Mine Trailing Cables

Ordinary underground coal mine trailing cables—when ignited as a result of either mechanical injury or overload—will propagate flame and may carry the fire to other sections of the mine. But not U. S. Royal Cables! They are jacketed with a special flame-retardant 60% neoprene compound which also withstands cutting, chipping, abrasion, grease and oil.

U. S. Royal gives "Service beyond price and specification" because United States Rubber Company is the only electrical wire and cable manufacturer to grow its own natural rubber, make its own synthetic rubber and plastics. Such control of the manufacturing process results in a quality product, Available in black, or gold for better visibility.





Free illustrated booklets, "U. S. Electrical Wires and Cables for the coal mining industry" and "U. S. Royal Gold Portable Cables for the mining industry." Write to us at Rockefeller Center, New York 20, N. Y.



Electrical Wire & Cable Department

United States Rubber



SUPPORT THE ROOF PROPERLY, then cut and load the coal.

Time for Soul-Searching . . .

EVERY SUPERVISOR in the industry is well-advised to take a sober look at the accident statistics for recent months. A startling turn for the worse is evident in reports for December and January. There has been no appalling disaster to account for the backslide. It is, rather, a series of events where good men, one after another, have become the victims of roof falls or haulage accidents or electricity.

Direct responsibility for safety rests most heavily on the immediate supervisors of the men. Having invested money and designed programs to insure safe properties, top management must of necessity delegate the hour-by-hour promotion of safety in the workings to the line supervisors.

The spectre of more and more accidents cannot be driven away by any means except the exercise of closer supervision in the face areas. Tougher application of approved safety rules in roof support, shuttle-car operation, track haulage and so on is the first step. Then a review of the lessons learned in 100% arcident-prevention training is in order.

Section Level (from p 82)

out of belting to increase capacity of the cars while allowing for slight variations in headroom. Increasing the capacity of any mining machine is a sure way of getting increased efficiency.

Another way is to eliminate labor, either by combining jobs or by making tasks easier to perform. Among this month's Operating Ideas is one showing how a track switch may be safely thrown by the locomotive operator from his position in the cab.

Furthermore, efficiency may be served by making jobs safer. Another of this month's Operating Ideas explains how a special tool was designed to increase safety in trimming roof over a trolley wire. The impact of all these ideas does have a beneficial effect on mine output.

In the March, 1956, issue (p 81) is another idea, developed right on his section by the section supervisor, which solves a critical problem and thereby increases the overall efficiency of his continuous-mining machines. This supervisor came up with a better way of supporting line curtains, certainly a worthy development.

A similar development on a much larger scale is described in the September, 1955, issue, beginning on p 72. The supervisors at an Indiana deep mine designed their own pit car loader for use in a thinner seam, thus introducing a number of benefits that showed up brightly on the cost sheet.

These are examples of what can be done. Each of these ideas was developed and adopted to make a good operation just a little bit better, and each is a result of engineering on the section.

HOW TO PROCEED

As previously stated, exercising this kind of industrial engineering is primarily a supervisory state of mind. The supervisor who continually improves upon past performance in his section has acquired the habit of observing with a wholesomely critical eye everything that takes place in his section. This does not mean that he is a sour-faced faultfinder. He may be more aptly described as a man who has a mature understanding that the word perfection has a precise meaning. Perfection cannot be improved. But he knows that most human effort falls short of that, so he proceeds on the valid

assumption that there is room for improvement.

Formal time studies, using stopwatch, pad and pencil, need not be undertaken by the mine supervisor, except in special cases where his acuteness as an observer may be needed by top management. In the normal tempo of operations it is the supervisor's experience that becomes of value. He knows how long it should take to do certain tasks. He knows what averages should be maintained in daily production.

He realizes that there are only so many elements involved in the job of getting coal out. And occurrences that appear to be entirely out of the ordinary to the uninitiated are to him routines that merely happen less often. For example, it may not be necessary in his section to take down bad pieces of roof every day, but he has seen it done often enough to know how long it should take and what tools are required. You see, his experience provides him with acceptable standards of performance for the various work activities in his mine or section.

His main effort in supervision consists of keeping up to these standards by intelligent direction of his men and their equipment. As he develops greater mastery over this requirement of his job, he finds that he has time to look for ways to improve certain aspects of the cycle.

A delay may not appear as a big dislocation in operations if it occurs only once. But if it repeats, the good supervisor pounces on it, demanding to know in his own mind why it happened and how it can be prevented from happening again. The ability to do this requires that he have a knack of sensing when the even throb of operations has been disturbed. His reaction time in this matter is inversely proportional to his length of experience, generally speaking. However, the ability to sense trouble and react quickly may never be fully developed if the supervisor is not firmly convinced in his own mind that it should be developed. It is one of the marks of the alert mine boss.

Industrial engineering on the section level, therefore, begins when the supervisor approaches the work with a sure knowledge that he can improve it and with the will to try.

WHAT THE BENEFITS ARE

In all instances, the intelligent application of genuine industrial-engineering principles should result in increased productivity, other conditions being equal. Naturally a more favorable cost relationship follows. These are direct and immediate benefits, leading to other advantages such as, improved competitive position, more working time and better working conditions, all of which are in turn directly beneficial to employees.

It is on this latter basis that you can justify your kind of industrial engineering to your men. They may resent a stopwatch—if the reasons for its use are not properly set forth—but your improvements on the section can be made plainly evident. In any event, the knowledge that you have been able to make some improvement is worth the effort you put forth to achieve it.

Caterpillar announces a TURBOCHARGED

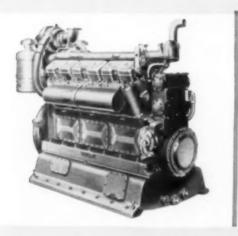
D397
(SERIES D)

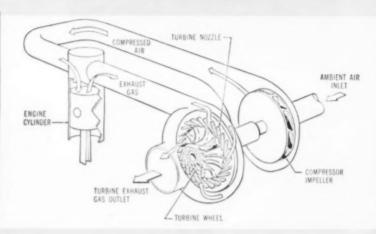
650 HP
Maximum @ 1300 RPM

AND

D375
(SERIES D)
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Compact, modern heavy-duty diesels for greater power, efficiency and economy!





The Cat D397 Turbocharged Engine

Both the D397 and the D375 are also available as roots blown, naturally aspirated or spark ignited engines.

The Turbocharger... Exhaust Gas and Air Flow

Another example of Caterpillar leadership in action! The Turbo-

charger, driven by the engine exhaust, utilizes energy which would otherwise be lost. It packs air into the engine according to engine load for greater efficiency.

As shown in the diagram above, engine exhaust gases turn the turbine, which drives the compressor...the compressed air then enters the cylinders. Final result: more power on less fuel.

More than eighteen years of research have gone into these two new CAT* Turbocharged Diesels. Incorporating metallurgical, mechanical and aerodynamic advances, they are engineered to deliver higher horsepowers and lower operating costs at reduced noise levels. Their advance-design features are also available in D397 and D375 Electric Sets and Marine Engines.

With these engines in the Caterpillar lineup, you now have an even wider choice of compact, modern heavy-duty power to meet your requirements. Get the complete facts about these two new Turbocharged Diesels from your Caterpillar Dealer!

Caterpillar Tractor Co., Peoria, Ill., U.S.A.

CATERPILLAR*

*Caterpillor and Cut and Begintered Trademarks of Caterpillor Tractor Co.

MODERN HEAVY-DUTY DIESELS

OPERATING IDEAS



Motorman Throws Switch From Cab

MOTORMEN can operate manual switch throws at the Enocomine without leaving the locomotive. A simple apparatus made from a piece of wire rope and power-cable supports permits the operator to throw the switch in either direction as his locomotive crosses the frog. One end of the wire rope is connected to the switch throw and the other terminates at a handle hanging slightly below the roof at the frog. The wire rope is laced through four cable supports that keep it close to the roof.

Plastic Bar Prevents Shock

SCALING loose rock near the trolley wire is done safely and efficiently with a combination plastic and metal test bar at Enoco mine. Riley Risley, shop foreman at Enoco Collieries, demonstrates how the user is not shocked when the bar comes in contact with the trolley wire. The 33-in bar is made up of a steel scaling end, a hollow plastic handle and a rounded brass sounding head. The plastic tube is 24 in long and has a 1½-in O. D. and a ½-in I. D. It is tapped at each end with about 2 in of SAE fine threads. Each of the metal ends is threaded to fit inside the ends of the plastic tube.



Belt Makes Flexible Sideboards

MORE PAYLOAD per shuttle car in thin coal has been made possible with flexible belt sideboards at the Enoco Mine. The company is using continuous miners in areas where there is a minimum of clearance and where steel sideboards would frequently rub the roof. To keep shuttle car capacity at a maximum and eliminate damage to sideboards, strips of old rubber conveyor belt were bolted to the frame in place of the metal units. Ray Wools, section foreman, demonstrates how the rubber sideboard is easily bent.

See us at the American Mining Congress, Netherlands Plaza Hotel, Cincinnati, May 7-9

> HANDLE WITH ABANDON!

U.S. Matchless Wire Braid Air Hose

No "babying" needed here! U.S. Rubber Engineers designed this premium quality hose with more than enough brute strength and stamina to withstand the highest working pressures, the toughest construction conditions.

And U.S. Matchless® has proved its ability to take both use and abuse indefinitely-on jobs around the world-serving long after ordinary hose has been ruined by abrasion, crushing and high pressure.

Yet in spite of its great strength, U.S. Matchless is highly flexible-practically as easy to handle as a garden hose.

Mandrel-made, wrapped-finish U.S. Matchless Wire Braid Air Hose is available in 50 ft. lengths from any of our 27 District Sales Offices, or by writing to us at Rockefeller Center, New York 20, N. Y. Whatever your hose requirements, it pays to turn to "U. S." There's a job-engineered U. S. Hose for practically every purpose - a staff of "U. S." Engineers to assist you in your hose selection.

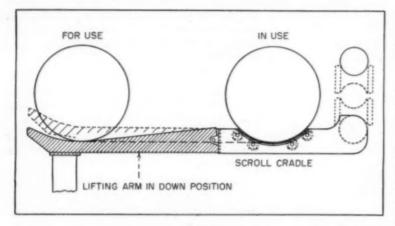
- * tube of high quality neoprene is completely resistant to line oil
- special steel wire braid gives tremendous strength, permanent bonding assured by heavy gauge rubber





Mechanical Goods Division

nited States Rubber



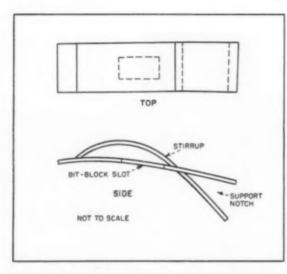
Auger Sections Handled Mechanically

MECHANICAL HANDLING and positioning of auger sections of a Cardox coal auger is done with a device developed by D. H. O. Bishop, No. 5 area mechanization engineer, and E. B. Park, divisional mechanization engineer, North-Eastern Division, according to an article in the December 8, 1955, issue of the Colliery Guardian, published in London, England.

The device includes a shallow cradle which positions the auger section in line with the hole to be bored and the boring axis of the machine, and a light platform which receives the section withdrawn from the previous hole. This platform is attached to the cradle by a hinged joint and can be raised or lowered by a hydraulic cylinder operated by the hydraulic system of the auger.

The cradle is made up of a series of long rollers conforming to the curve of the auger section and positioned so that the weight of the auger section and boring head is supported by it when they are connected to the auger drive.

Auger sections from the previous hole are withdrawn directly onto the platform of the device and detached. When they are needed for the new hole, the drive chuck is withdrawn and the platform raised hydraulically. This causes the new section to roll onto the cradle and into position for augering. The device not only increases productive time but also reduces the manpower needed to operate the auger.



STEEL BLOCK prevents motion of continuous-miner chains while bits are changed.

Block Makes Bit Changing Safer on Continuous Miner

CHANGING continuous-mining-machine bits at the face can be hazardous for the man doing the job, if the machine is turned on by inadvertence or accident. Usually, it's a two-man job, with one man operating the controls to rotate the cutting chains to bring worn bits into position and the other replacing the worn bits. To eliminate the hazard, maintenance men and officials at Springdale mine, Allegheny-Pittsburgh Coal Co., Logan's Ferry, Pa., have designed and built a steel block which can be braced against a structural member of the 3-JCM machine and dropped over one of the bit blocks to prevent motion of the chains.

As shown in the sketch, the block is made of a 3½x14x½-in steel plate, bent to conform to the configuration of the chains. A fishtail is made by welding another piece of plate to the bottom of the block to form a notch which engages a rigid member on the mining head of the 3-JCM directly in back of the chains. A 1¼x2½-in slot is cut into the main plate to fit over a bit block regardless of the block position in the lacing pattern, and a reinforcing stirrup, also a piece of ½-in plate, is welded to the top of the block, as shown.

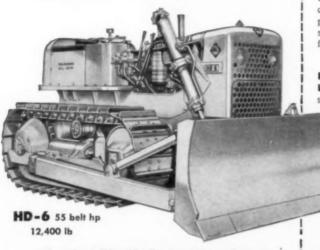
The man at the head end of the machine, changing the bits, drops the block into place over a bit block and against the brace before attempting to work on the bits.



Machine Places Mortar Lining

SIMPLIFYING a tough job is the assignment of this unusual machine used to spread a cement mortar lining in a 47½-mi pipeline. Three rotating trowels smooth out the mortar, which is placed on the wall of the pipe immediately ahead of the trowels as the machine advances. The job of lining the 58½-in-diameter steel pipe is believed to be the longest single pipeline ever cement-mortar-lined in place. Started in 1952, the lining job was completed in December, 1955, and will increase San Francisco's daily water supply capacity by at least 14 million gallons. The San Joaquin pipeline No. 1, originally laid in 1932 with 30-ft sections of 58½-in steel pipe, was designed to carry 62 million gallons of water per day across the San Joaquin Valley.

This kind of Crawler Tractor Design gives you extra mining output



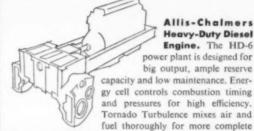
. . and only Allis-Chalmers HD-6 has it—

advanced design features that combine big performance, versatility, dependability and simplified servicing!

Look at the Allis-Chalmers HD-6—you can see its functional design...how it's built to give sure-footed traction, better working balance. But there's more to this crawler tractor than meets the eye—the performance advantages of Allis-Chalmers advanced basic design. It provides more working power, more strength in all components, more working weight where it's needed...makes the HD-6 an outstanding performer with drawn or mounted equipment... easier to operate and maintain.

Let your Allis-Chalmers dealer show you how the HD-6 can give you that *extra* output on your jobs.

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION MILWAUKEE 1. WISCONSIN



burning. Follow-Through combustion sustains effective working pressures to take advantage of better crankshaft leverage.

Special Strength and Protection. Exclusive all-steel box-A main frame makes possible superior over-all balance, better equipment mounting . . . plus service simplicity of unit construction. Major assemblies like engine and clutch can be removed without disturbing adjacent parts. One-piece "wrap-around" radiator guard provides maximum strength for bulldozer mounting . . . complete protection for radiator.

Extra Clutch Life—with Ceramic Lining. The HD-6 master clutch offers simple, single-plate, over-center design.

Revolutionary new ceramic button clutch lining keeps clutch operating longer between adjustments . . . lengthens clutch life . . . reduces lever pull for easier operation.

Straddle-Mounted Final Drive Gears. Tapered roller

bearings support both ends of the final drive gear shafts. Smaller gears

and shorter shafts (plus line-bored, one-piece case), provide better bearing and gear alignment, more strength, longer life. Double-reduction final drives provide greater ground clearance.

6 阿 **6 0**

New-Design, Heavy-Duty Track. HD-6 track provides long life under the toughest conditions.

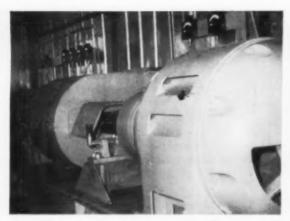
HD-6 sidebars have more steel where it's needed... benefit from new heat-treating methods which make possible new standards of strength and hardness throughout for extra wearability.

Other Outstanding HD-6 Features

... no other tractor in this size class has them—at no extra cost you get roller bearing truck wheels, idlers and support rollers; 1,000-hour lubrication intervals for truck wheels, idlers and support rollers; 24-volt direct electric starting; crankcase guard; bumper; and lights.

ALLIS-CHALMERS





COOLER fan bearings in summer when the mercury is 100 deg or better is achieved by using mine air for cooling at Lone Star Steel Co.'s Carbon No. 5 mine.



GALVANIZED TUBING picks up air from fan discharge and delivers it to nearby fan house. Tubing is painted white to reflect heat from sun.

Mine Air Cools Fan Bearings In Hot Weather



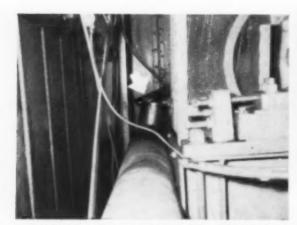
THERMAL INDICATORS register temperature of the different bearings. Units stop the fan if the bearing overheats for any reason.

HOT WEATHER is not far away. And with it will come the danger of overheated bearings on equipment working in the hot atmosphere. When temperatures soar into the 90's and nudge toward 100 or better bearings on big mine fans get hotter and the margin of operating safety is narrowed. This problem has been eliminated at the Carbon No. 5 mine of the Lone Star Steel Co., McAlester, Okla. By putting cool mine air to work the company has lowered bearing temperatures from 160 deg to about 135. Here's how it is done:

A duct of 8-in galvanized tubing is installed between the fan discharge and the various bearings to distribute the cool air. To keep the air as cool as possible as it travels through the tubing, the exterior of the conduit is painted white to reflect the heat of the sun. The main current of air is split into two circuits inside the fan house and then directed to the bearings. Outlets in each circuit are reduced to 6-in to increase the velocity of the air crossing the bearings. Deflectors at each discharge point direct air onto the bearing.

Lone Star Steel installed the new Jeffrey Aerodyne 12A-58 fan at the Carbon No. 5 mine on Nov. 25, 1954. Delivering 135,000 cfm of air at 9.5 in w. g., the fan is a vital unit at the mine. The unit is powered by a 300-hp 2,300-v motor turning at 900 rpm and drawing 55 amp.

In addition to providing cooling air for the fan-shaft bearings, the company has installed automatic thermal indicators that stop the fan if any bearing should become overheated.



INSIDE VIEW of fan house shows tubing following wall. Discharge end is reduced to 6 in. to increase velocity.



DEFLECTOR at end of pipe directs cool air over bearing. In hot weather, temperature is reduced about 30 deg.

designed for nigher production

LOWER IN COST ... EASIER AND SAFER TO USE

DUOMATIC

utstanding performance features make PROX Coal Cutting Equipment leaders in the industry today! PROX cutter chains, tool steel bits and bars set an impressive record in higher production at lower cost. Chemically treated pins and bushings resist rust and corresion. Prex Chains, fast and smooth operating, mean tess breakage and down-time. Equipment made by Frank Prox Company means lasting dependability and efficiency.

TOOL STEEL and TUNGSTEN CARBIDE

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GOOD TIMING is important in getting the most from haulers. Full scraper pulls out as empty unit arrives.



UNLOADING is done as scraper moves across the spoil area. Refuse is laid down in even quick-drying layers.

Earthmover Speeds Refuse Disposal

HAULING 1,500 to 2,000 tpd of mine refuse calls for big, rugged and fast-moving equipment. Earthmoving scrapers owned by DeBaldo Bros., Glenshaw, Pa., are handling that much material at a large mine north of Pittsburgh, Pa. Sticky, wet refuse is carried to a hopper by conveyor belt. The DeBaldo Bros. then carry the material nearly a mile to a disposal area. With more than a year's experience, the hauling contractors report that their scraper method has proven best and most economical for this job.

First consideration in choosing the LeTourneau-Westinghouse scrapers was their speed of better than 25 mph. In addition they offered other adva.itages which could be applied to the job. The big low-pressure tires would provide flotation, permitting them to operate on the soft waste without getting stuck. Simple, rugged construction eliminating springs, frame steering assembly and drive shaft would shorten lubrication time and

simplify maintenance of the large refuse-hauling units.

The scraper's ability to spread refuse in controlled layers has definite advantages. The material is laid down in a thin layer while the scraper is moving and thus dries more quickly to provide a more firmer footing for following trips. This adds up to more trips per day. Since the scraper lays the load on the level it is not necessary to use a bulldozer to smooth it.

Two units, carrying 16 to 20 tons per load, handle the

Two units, carrying 16 to 20 tons per load, handle the disposal job and an Adams 440 motor grader scrapes and smooths the road between the bin and refuse area. Operators of the scrapers handle loading themselves and their skill in operating the units plays an important part in the success of the operation. The company reports that the scraper design adapts itself readily to the job. It maneuvers well, is low enough to fit easily under the hopper and the large square open top permits fast loading.



Electricity Powers 24-ton Truck

BIG ELECTRICALLY POWERED 24-ton trucks are now hauling limestone underground at the Riverside Cement Co., Riverside, Calif. Design details of electrical equipment for the Kenworth truck were worked out by the General Electric Co. Powered by an electric traction motor, the end-dump unit receives current from overhead wires through a trolley. The truck is equipped with a cablereel so that it can be maneuvered away from the overhead wire.

The main 550-v traction motor is located where the transmission normally is located. An auxiliary 550-v motor under the hood powers the air compressor, power steering, hoist pump and lighting system. Power steering, two-step dynamic braking and rubber-mounted springs are features of the unit.

a least screen...for NEW profits

B 7

In coal sizing...

ALLIS-CHALMERS

Model S

VIBRATING SCREEN

Handles coal up to 6 inches

Here's New proof you get MORE...MORE VALUE when you specify A-C!
Every feature of the new Model "S" screen has been carefully calculated
to give you outstanding performance at lowest possible cost...

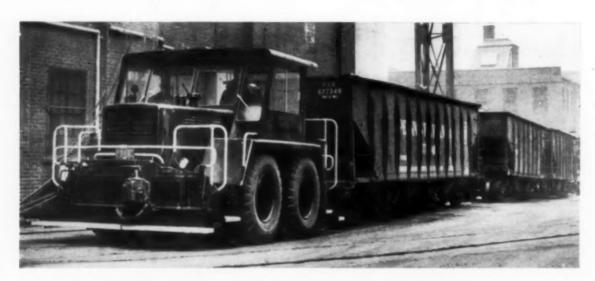
- Added screen cloth life provided by close spacing of clamping bar bolts and by proper camber of deck.
- 2. Rigid side plates reinforced by vertical angles.
- 3. Sturdy screen deck frame features heavy channels, diagonal braces, replaceable cross members.
- 4. No metal-to-metal contact. Full-length rubber buffer strips cushion screen cloth.
- Screen surface easy to install Surface slides into place over full-length hook supports. Selflocating clamping bar assembly accommodates screen surface of any thickness.
- All parts replaceable. All bolted construction, using locknuts.
- Feed box (optional) absorbs impact of incoming material. Provides uniform distribution when equipped with flow control gate.
- Back plate (standard) prevents spillage adds structural strength.
- Springs prevent whipping and breaking of screen cloth by maintaining proper tension.
- 10. Simplified mechanism assures maintenance economy,

For complete information, see your A-C representative or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. Ask for Bulletin 07B8229.

ALLIS-CHALMERS



EQUIPMENT NEWS

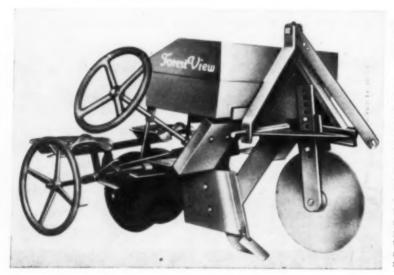


Rubber-Mounted Switcher Pulls 1,000 Tons

A rubber-mounted rail car switcher, powered by a 208 hp diesel that enables it to pull 1,000 tons from a standing start, has been built by LeTourneau-Westinghouse, Peoria, Ill. Designed to handle switching operations in congested areas, the switcher, or "SwitchMobile," is expected to speed rail car movements because of its ability to travel without rails. And although it weighs less than 36,000 lbs (dimensions: 10 ft 3 in wide: 10 ft 13

in high; length, that of an automobile), the manufacturer says that the traction provided by rubber tires (18:00 x 25) permits the "SwitchMobile" to equal the performance of a 50-ton switch locomotive. A wheel gauge of 8 ft 4½ in permits it to straddle rails and run on ties as well as on yard pavements. Low pressure in the tires is said to prevent damaged ties. LeTourneau-Westinghouse designers have given the "SwitchMobile" a four-speed

transmission that provides the same gear ratios in both directions, backward or forward. Car couplings and air brake lines on each end are standard railroad equipment. But, for flexibility the couplers have been mounted on sliding tracks to permit the coupler and air hoses to be centered or swung right or left. No price is available yet, since LeTourneau-Westinghouse has built only one model for the Pennsylvania Railroad, Jersey City, N. J.



Develop Seedling Planter For Quantity Tree Planting

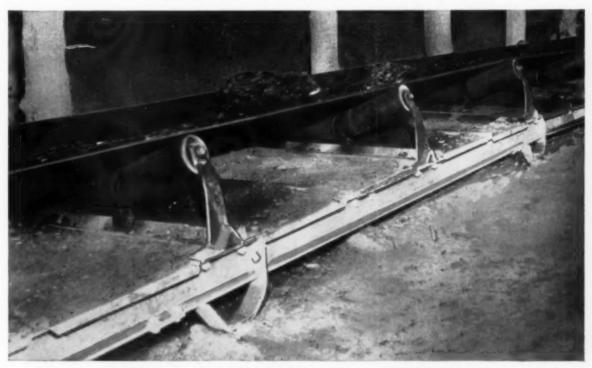
A Pennsylvania tree nursery, Forestview Evergreen Nurseries, Germania, Pa., has developed a tree planter which, the company says, is the practical solution to planting problems where large quantities of seedling trees must be planted in a hurry. The planter, according to Forestview Evergreen Nurseries, works equally well over any kind of terrain. For reforestation, conservation and watershed planting, the machine, named the "Tandem," has been equipped with a wheel control for following uneven contours. Features: timing wheel to control spacing of plants; adjustable coulter and point; replaceable steel trench spreader; twin seats designed to speed planting; and a three-point hitch for hookup to most tractors.

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Fire Resistant*
Neoprene covers
Resists severe impact
Flexibility
Troughs easily
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Excellent for long and short hauls, also slopes
Runs true on idlers
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*Acceptance designation: "FIRE RESISTANT, U.S.B.M. No. 28-7" Jan 27, 1956



Tell us your conveyor problems! We welcome the opportunity of proving that Hamilton PYROPRENE* will lower your costs and provide fire resistant* protection.

Write, wire or phone for more details of Hamilton service. Ask for a copy of our 1956 catalog.



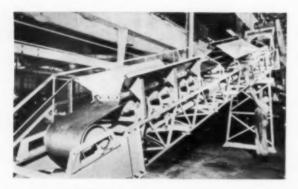
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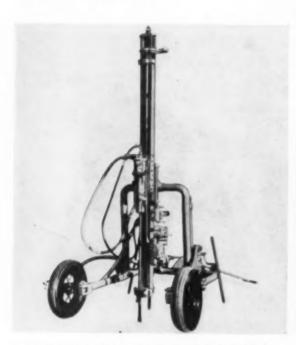
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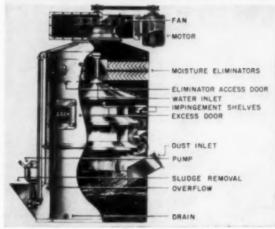
Pre-Fab Belt Conveyors Announced

Pre-fabricated sectional belt conveyors in standardized, preengineered units are being produced by nine Link-Belt Co. plants. Named "Pre-Bilt" by the company, the units are designed for capacities up to 1,500 tph and have been constructed with the company's Series 50 belt idlers. They are built in 18, 24, 30 and 36 in belt widths and 24 and 42 in deep trusses. Drives range up to 40 hp. The conveyors will be built in the plant nearest a jobsite, according to the company. Dept. PR, 307 N. Michigan Ave., Chicago 1, Ill.



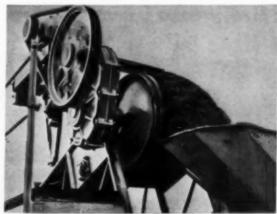
Wagon Drills Feature Auto Controls

Two air-driven wagon drills featuring automatic controls grouped on a motor that can be re-positioned along the mast have been announced by Thor Power Tool Co., Aurora, Ill. The drills are the SW-1, a general purpose model, and the BW-2, a heavy duty unit. The SW-1 mounts either a Thor 75 or 77 sinker rock drill or a Thor 82 drifter. It is equipped with a saddle and cone to permit mast adjustment for drilling holes through a full 360 deg in all directions. To drill at levels down to extremely low positions the chassis is "collapsed" by a worm drive. The BW-2 (photo), built around Thor's Model 105 drifter, can also be used with Thor's 82 or 92 drifters. The BW-2 has been equipped with a newly designed mast that can be bought as a separate unit. The mast has grouped, movable controls, including a motor feed control.



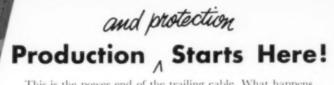
Water Used to Trap Fumes, Dust

A cone type dust-fume collector, consisting of a cylindrical drum and internal wash-producing structures, is being produced by the Zack Co., 4600 W. 12th Pl., Chicago 8, Ill. The collector employs a cone and baffle design. In action, curtains of water supplied by a direct-driven pump cascade downward inside the collector. Dust and fume laden air are filtered in their upward travel by the falling curtains of water. Then the wet dust is carried to a sludge tank for removal. The collector's flat bottom serves as a settling tank from which the water is recirculated. A chute cleanout is provided for simple hand cleaning of the settling tank, although automatic ejection can be acquired by using flight conveyors. The collector is made in sizes and capacities from 500 cfm to 40,000 cfm.



Shaft-Mounted Speed Reducers

The Dodge Mfg. Co., Mishawaka, Ind., has introduced two new models, No. 8 and No. 11, to its "Torque-Arm" line of shaft-mounted speed reducers, No. 8 has a capacity of 60 hp at 100 rpm, AGMA rating, and can be mounted on shafts up to 5 in in diameter. No. 11 has a capacity of 1.3 hp at 100 rpm. No foundation, no flexible couplings, no sliding base are required, the manufacturer says. The reducers are mounted directly on a shaft and the reducer's "Torque-Arm" is fastened to any fixed object for anchorage. The unit is driven by a V-belt drive and "Taper-Lock" sheaves permit any speed ratio wanted. A "Tri-Matic" overload release (optional) loosens the belts, cuts off power and warns of excessive loads. A built-in backstop can also be provided for conditions that require a device to prevent rotation direction reversal.



This is the power end of the trailing cable. What happens here reveals what's happening at the other end—whether you're getting full power, full production from your mine machinery without sacrificing adequate short circuit protection.

When you standardize on O-B Fused Taps you can be sure you're getting both-production and protection!

These sturdy bright red tap cases are lined with asbestos, reinforced at both ends, and properly vented for safe, long-lasting service. A wide variety of interchangeable contacts and cable terminals offers a complete range of current carrying capacities and mechanical strengths.

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Feeder and Tralley Materials . Control Materials . Tralley Shoes Roof Bolt Shells and Plugs . Rail Bonds . Automatic Couplers





O-B Expansion Shells and Plugs
"Go Up Easy and Stay Put!"

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Safe, Neat, Fast - O-B Branch Connectors



For any combination of copper and aluminum cables, running parallel or at right angles, in sizes ranging from 4/0 to 1,600,000 cm. For complete listings of aluminum feeder fittings and correct installation procedures send for O-B Catalog "Supplement No. 1."



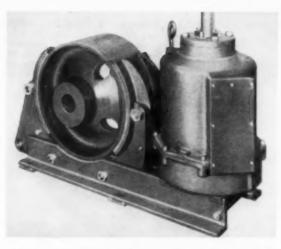
Okio Brass

MANSFIELD

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Feeder and Tralley Materials . Control Materials . Tralley Shoes Roof Balt Shells and Plugs . Rail Bonds . Automatic Couplers



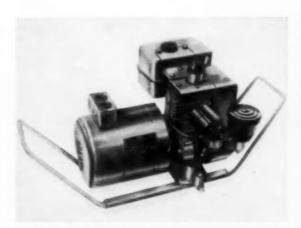
Magnetic Brake Needs No Adjustment

A DC magnetic brake (Type SA) that is said to eliminate any need for adjustment throughout its service life is being manufactured by the Westinghouse Electric Corp., 401 Liberty Ave., Box 2099, Pittsburgh 30, Pa. The company says that the self-adjusting feature decreases maintenance and down time and provides longer life for the brake's lining and wheel. Regardless of lining wear or wheel expansion, says Westinghouse, the brake shoe will remain adjusted and aligned with the wheel. Once the correct torque setting is made for a given application, it need never be changed. By not permitting the brake's shoe tips to drag, the self-aligning design provides for even lining wear, the company says. In some applications lining life reportedly has been increased 50%. The brake is available in all DC motor sizes. Rectifiers are needed for AC use.



Rotating Drum-Handling Attachment

The Yale & Towne Mfg. Co., 11000 Roosevelt Blvd., Philadelphia, Pa., has announced the development of a rotating drum-handling attachment of 2,000 lb capacity which is said to be capable of serving a number of drum-handling assignments. The maker says the attachment is particularly effective where quick horizontal placement or stacking is a requirement. Its design includes two rubber-coated clamp arms, one articulating and shaped with two concavities to fit the shape of a drum, the other flat-surfaced and tapered to guide drums into position after clamping pressure has been released. The entire attachment rotates 90 deg and will pick up drums from a vertical position and stack them horizontally at a height limited only by the truck on which the attachment is mounted. The clamp will handle two drums in this manner, the maker says.



Portable Plant Rated At 1,000 W

A lightweight (88 lb), gasoline engine-driven electric plant rated at 1,000 w continuous duty is being manufactured by the International Fermont Machinery Co. Inc., Ramapo, N. Y. The plant is sold as a completely operable "basic unit," according to the company, which says it will supply special accessories. The "basic unit" is a manual-starting, two-wire, 60-cycle, AC, single-phase set. Its gasoline engine (Briggs & Stratton) is equipped with an air filter, fuel system and tank, a radio-shielded ignition system, muffler and governor. A rotating armature-type AC generator is attached. The entire unit is permanently mounted on a steel base and carrier. Two receptacles have been installed for electrical connections. Design includes a 15% overload capacity for emergency service.



Portable Seismograph Records Blasts

A portable (38 lb) blast and vibration seismograph for photographically recording vibrations generated by blasting and by industrial operations is being manufactured by the W. F. Sprengnether Instrument Co., 4567 Swan Ave., St. Louis 10, Mo. Only brief instruction is required to operate the unit, which responds to perpendicular and horizontal ground movements and can be set up in minutes. The manufacturer offers to supply interpretation of the instrument's records, since some specialized knowledge is required for the interpretation. The seismometer's basic system consists of two inverted pendulums that respond to perpendicular components of the horizontal ground motion, and a single spring-supported vertical motion pendulum for recording vertical ground motion.





Motor Base Adjusts Belt

A motor base that requires no regular maintenance for proper drive belt tension, the No. 500 "Tens-A-Matic," is said to take up belt stretch and automatically absorb starting loads. The "Tens-A-Matic," manufactured by the Murray Equipment Co., Inc., 11350 Schaefer, Detroit 27, Mich., cuts belt-changing time to a matter of minutes the company says. When a belt needs replacing, a motor equipped with the base is tilted forward and blocked. The base eliminates motor or belt realigning, since it adjusts the new belts to proper tension. Available for motors up to 200 hp.



"Biggest Ditcher" Title

Gar Wood Industries, Findlay, Ohio, has announced what it calls the world's largest ditching machine, the "Gar Wood-Buck-eye 330." The machine excavates 600 cu The machine excavates 600 cu yd of dirt an hour and cuts a trench 11 ft 3 in deep, 5 ft 4 in wide, according to the company. One man can operate the machine, which, the company says, was developed because of a trend toward larger and larger diameter pipeline construction. Mounted on 30-in tracks in the rear and 30-in pneumatic tires in front, the "330" is controlled with hydraulic power steering. A diesel rated at 220 hp powers two transmissions that provide speed ratios for traction drive and a choice of 15 speeds for the digging wheel drive. Shifting can be done at all speeds; speed is controlled without stopping the forward drives of either the machine or the digging wheel; travel mechanism can be stopped while the digging wheel continues to operate.

Fork Lift Truck Tilt Mast

Kwik-Mix Co., Port Washington, Wis., a subsidiary of Koehring Co., has announced an attachment for its Model S-10 "Moto-Bug." Future production models of the three-wheel fork lift unit can be equipped with an optional double acting hydraulic valve that will enable an operator to tilt the mast and raise loads with one hand. With the lift attachment the "Moto-Bug" mast can be tilted 10 deg backward or 2 deg forward. Forks are 30 in in length and adjustable from 6 to 32 in in width. The S-10 has a rated lifting capacity of 1,000 lb, lifts to a 6 ft height.



Speeds Hose Replacement

A low pressure, push-on fitting for use on machine tools or shop air, water, fuels and lubrication lines is being manufactured by the Flex-O-Tube Div., Meridan Corp., Inkster, Mich. In addition, the company is making a special two-bolt clamp fitting for high pressure, heavy duty applications: e. g., hydraulic lines, steam hoses. The push-on fitting (brass) is made in 1/4-, 3/6- and 1/2-in sizes and is designed for pressures up to 250 psi. It is assembled dry or with water as a lubricant by pushing a hose over twin ferrules on stem. Feature: hose replacement without removing the fitting from a shop machine. Flex-O-Tube's other fitting, the "Dynalok," is made of malleable iron and is secured with two bolts. Also reusable, the fitting can be left on a machine and a new hose placed over the stem. Flex-O-Tube says it has engineered the "Dynalok" for heavy road building equipment, as replacement fittings for tractors, full transfer lines and general heavy duty plant equipment. Diameters:



Cross-Stream Coal Sampler

Denver Equipment Co. has announced an "Automatic Sampler with End Carriage" which, the company says, has been designed to provide accurate sampling in normally inaccessible places. The unit is designed to sample intermittently the entire width of a coal stream and thus

Amazing new electronic Colors | detects slightest imperfections in wire rope

This new inspection machine literally "sees through" wire rope and detects any imperfections that may occur in the manufacturing process. It inspects every inch of rope, 360° around, and all the way through! If an imperfection occurs, the machine instantly records it on a chart, squirts paint on the rope, lights a light and alerts the operator to correct the flaw.

In the preliminary tests using wire rope containing specimen broken wires, the electronic "inspector" proved 100% effective. It didn't miss one. These tests prove to us that this device will give the regular inspector a superior tool which will work continuously and will "see" all.

To our knowledge, American Steel and Wire Division is the first wire rope manufacturer to recognize the possibilities of this electronic inspection device as an *extra* step in quality control that will assure better, more uniform wire rope.

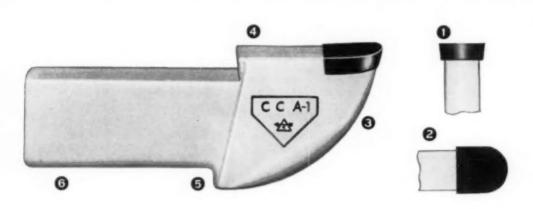


AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL, GENERAL OFFICES: CLEVELAND, OHIO COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO . TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS AMERICAN TIGER BRAND WIRE ROPE

Excellay Preformed

UNITED STATES STEEL



- 1 Side wear eliminated. Ideal in coals that core.
- 2 Smooth, free cutting action. Tip has full nose radius.
- 3 Cleaner cutting action. Tip on top, and maximum clearance on shank, make cutting cleaner, easier.
- 4 Easier to change. Removal notch re-
- duces time and work in bit changing; reduces maintenance costs.
- No jamming. Stop assures accurate position and maximum hold; prevents bit from being jammed into sprocket.
- 6 No bending or breaking. Heat-treated, forged steel shank gives maximum resistance to deformation.

New Carboloy CCA-1 Recovery Auger Bit cuts cleaner, sharpens easier

In the roughest going, the new Carboloy® CCA-1 will get maximum tonnage from recovery augers . . . using a minimum of power and pressure.

Two major advantages:

1. More tonnage per tool

- · increased output per grind
- · more grinds per tool
- · elimination of chipping, breaking, and side wear
- e cuts faster, smoother, freer

2. Lower maintenance costs

· longer tool life

- · easier to change
- easier to sharpen

This versatile bit can also be used with equal success in continuous miners or cutting machines using standard $\frac{1}{2}$ " x 1" bits.

Like all the tools in the complete Carboloy line, the CCA-1 is ready for immediate delivery from your Authorized Carboloy Mining Tool Distributor.

For price lists, specifications, or expert assistance on carbide mining tool problems, call your local Carboloy Distributor – you'll find his name listed on the opposite page.

"Carboloy" is the trademark for products of the Carboloy Department of General Electric Company

CARBOLOY

DEPARTMENT OF GENERAL ELECTRIC COMPANY

11120 E. 8 Mile Street, Detroit 32, Michigan

eliminate errors resulting from crossstream variations. Constant intervals between cuts are maintained, the company says, to obtain equal representation of the entire length of a stream. Intermittent operation of the sampler is controlled by Telechron motor-driven time switch that can be set for intervals from 2 to 55 min in 1 min increments. The sampler's chain drive, says Denver, is positive, permanent and adjustable. The unit's carrier block is fitted with ball-bearing wheels that roll on rigid, cold-rolled steel track. A limit switch cuts off the sampler's motor at the limits of carrier travel. And a magnetic brake on the end of the motor shaft prevents over-travel. Denver Equipment, Box 5268, Denver 17, Colo.



Carbon-Air Cutting

"Carbonaire," a specially designed power source for the carbon arc-compressed air method of cutting and gouging metals, is being manufactured by Hobart Bros. Co., Troy, Ohio. The machine is rated at 1,000 amp on 85% duty cycle, 900 amp on 100% duty cycle, at 36 to 54 v. Main current ranges are provided by four bus-type cable terminals-one negative and three positive. A cutting torch cable is attached to low, medium, or high current connections to suit the gouging or cutting job at hand. A hand wheel on the side of the control cabinet is used to adjust are voltage in any of the three ranges. And a toggle switch permits a soft start arc. The unit is designed for use with an electric power supply of 2 or 3 phase, 60 cycles, 220/440 v (dual) or for 550 v (single). It is also made to operate on 50 cycles or 25 cycles, as well as on a DC supply of 115, 230, 440 and 550 v.

Lubricant "Stabilized"

The Lockrey Co., Southampton, N. Y., manufacturers of "Liqui-Moly" (MoS₂), a lubricant that sometimes produced acids, says it has developed a chemical buffer that prevents free acid from forming under any conditions. The buffer, "Stabilex," also protects the oil in which the MoS₂ is suspended. Briefly, the Lockrey Co. says it coats the compound when it is still a dry powder, i. e., before its formulation into "Liqui-Moly." Lockrey adds that since the now "stabil-

ized" lubricant not only prevents acid formation, but protects the suspension oil, both friction and corrosive problems of lubrication are solved.



Automatic Conveyor Scale

Merrick Scale Mfg. Co., Passaic, N. J., lists four features with the announcement of its newest model automatic conveyor scale. Named the "H" Weightom eter, the unit incorporates what the company calls "continuous integration": (1) sensitivity to load variation; (2) accuracy; (3) steady, no-creep zero balance; (4) a design for heavy duty continuous service. Merrick says the scale has been field proven and is adaptable for control of auxiliary equipment.



Ether Aids Electric Starting

Caterpillar Tractor Co., Peoria, Ill., says it has improved its direct electric starting systems to an extent that starting without difficulty at 10 deg F is possible. Each of the systems (24 v) includes two ether starting aids as standard equipment and the necessary tubing to inject vaporized ether into the air intake manifold. The company says easy starting at 10 deg F is gained when the ether aids are used in conjunction with glow plugs, units that have been used in Caterpillar starting systems for some time. The starters are produced as attachments for D6, D4 and D2 tractors and Nos. 977, 955 and 933 "Traxcavators."

Spray Nozzle Muzzles Fire

A spray nozzle for transformer protection has been announced by Bete Fog Nozzle Inc., 309 Wells St., Greenfield, Mass. Named the Model T-1, the nozzle



Carboloy Mining-Tool Distributors

Your local Carboloy Mining-Tool Distributor is listed below. His complete stocks guarantee you immediate local delivery.

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COLORADO

Denver 17-Mine & Smelter Supply Co.

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Mt. Vernon-Central Mine Supply Co.

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Harlan—Kentucky Mine Supply Co., Inc. Madisonville—Central Mine Supply Co.

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OHIO

Cambridge—Cambridge Machine & Supply

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PENNSYLVANIA

Johnstown—General Electric Supply Cr., Div. of General Electric Distributing Corp. Pittsburgh—General Electric Supply Co., Div. of General Electric Distributing Corp.

Washington-Fairmont Supply Co.

Knoxville—Crowell Engineering & Sales Co. Knoxville—W. J. Savage Company

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El Paso—El Paso Saw & Belting Co. El Paso—Mine & Smelter Supply Co.

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Salt Lake City 1-Mine & Smelter Supply Co.

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WEST VIRGINIA

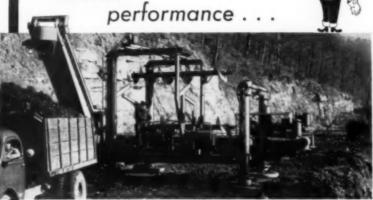
Bluefield — Bluefield Supply Co. Bluefield — Rish Equipment Company Charleston — Rish Equipment Company Clarksburg — Rish Equipment Company Fairmont — Fairmont Supply Company Montgomery — Marathon Coal Bit Co. Shinnston — Erwin Supply & Hardware Co.

CARBOLOY DEPARTMENT OF GENERAL ELECTRIC COMPANY

Detroit 32, Michigan

BIG in





Compton Budget Model 28 Coal Auger

The latest of the famous, efficient Compton Coal Augers, but already known for its record setting performance figures. Only 28 feet long this Compton Auger, with a crew of just 3 men will auger and load up to 65 tons of coal per hour. Compact and lightweight, it is right at home even in cramped quarters and does not require a great deal of costly advance preparation.

GENERAL SPECIFICATIONS - MODEL 28

Length: 28 feet Weight: Approx. 25 tons Carries twelve 12½ ft, auger sections

Required pit width: 30 ft. min. Power: 175 hp Diesel engine Hydraulic Frame Jack Lift: 54 inch

Auger Diameter: 44'' to 28'' Drills coal within $4\frac{3}{4}''$ of the bottom

Max. Drilling Depth: 150 feet



Only Compton Augers are equipped with the job-proven, non-clogging Compton Lump Recovery Head. Their built-in spider bearing assembly assures straighter drilling with less frictional drag.

Compton, Inc.

BOX 1946 • TELEPHONE 4-6384 CLARKSBURG, WEST VIRGINIA has been tested and approved by the Factory Mutual Laboratories, according to the manufacturer. Only four Bete T-1 nozzles per transformer are needed to isolate or extinguish a transformer fire before it spreads to other equipment, according to the company, which points out that many nozzles and a costly installation were required before. The Bete T-1 delivers approximately 80 gpm at 25 psi and has an 80 deg full-dome spray pattern suitable for outside work, according to the manufacturer. The nozzle is made of cast bronze and has 2 in female pipe-thread.



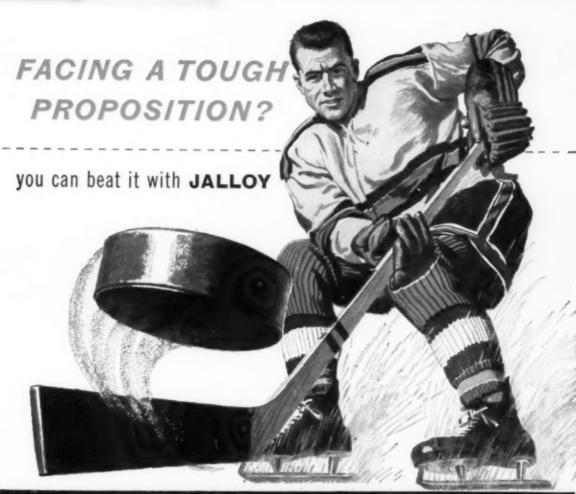
Shovel Crane Mounting

A mounting for attaching shovel-crane turntables to crawler or rubber-tire mountings, the "Shear Ball," has been announced by the Thew Shovel Co., Lorain, Ohio. The mounting is said to eliminate any need for top or hook type turntable rollers, center pins and nuts, exposed roller paths, and centering gudgeons, along with maintenance and adjustment usually associated with them. Thew says the mounting has been under development for 7 yrs and has been field tested under all types of shovel, hoe and crane conditions. It is described as being similar to a huge ball bearing. A circle of steel balls, sealed in a race, holds the turntable to the carrier or crawler and provides a rolling surface for revolving the turntable.



Varies Bin Vibrator Force

Cleveland Vibrator Co., 2828 Clinton Ave., Cleveland 13, Ohio, announces it has developed a feature for its electric bin vibrators that permits the force of vibration to be varied without changing weights. Each end of the vibrator has been equipped with two interleaving eccentric weights. The weights may be closed into a semi-circle to give maximum force, or opened into a ¾ circle for minimum vibration. The weights are held together with a bolt that permits vibration adjustment in minutes, the company says. Cleveland's RC-10, smallest of its line, has been equipped with six settings ranging from 140 to 550 lbs of impact. The RC-30 has seven settings with impact





J&L Jalloy Heat-Treated Plate is the general purpose steel that is heat treated to provide longer wear on applications where impact and abrasive conditions are severe.

In comparison with other abrasion-resistant steels as well as mild steels, it gives optimum results when heat treated to a Brinell hardness of 340 and up. Jalloy permits savings in steel costs, maintenance, and repair. Furthermore, it is easily welded.

Jalloy is available in three grades to meet various service requirements.



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For Fine Coal Cleaning, Employ SuperDuty Table Efficiency



Whether you prepare fine sizes by the carload or trainload, the SuperDuty DIAGONAL-DECK® Coal Table operates with an efficiency equalled by no other cleaning equipment today.

Free impurities, such as slate and pyrite, are separated with uncanny thoroughness. The result is exceptionally clean coal and minimum loss to the refuse. Cleaning efficiency of 98% represents usual and consistent performance for SuperDuty tables. On some coals efficiencies of 99% plus are maintained.

During the past decade practically every important new preparation plant has included SuperDuty tables. Write for complete performance data and full information. Ask for Bulletin 119.



CONCENCO® Spray Nozzles

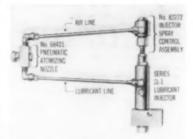
These handy noxxles are simple, flexible and economical. All you do is drill one oversize hole per noxxle, clamp on and get results. They can be definitely aligned for washing, sluicing or spraying according to need. They are removed or replaced in a moment's time.

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forces from 385 to 1,110 lb. The RC-50 provides a 750- to 2,250-lb range with seven settings.



Automatic Mist Lubricator

A device for automatically applying a controlled, measured quantity of lubricating mist on open gears, chains, cams, rollers, and similar surfaces is being manufactured by Lincoln Engineering Co., Industrial Div., 5729 Natural Bridge Ave., St. Louis 20, Mo. Named "Mist-Omatic Spray Control," the unit is designed for use in conjunction with Lincoln's centralized lubrication systems which, in combination, permit automatic, simultaneous lubrication of both closed bearings and open surfaces at pre-set time intervals. Features: uniform automatic lubrication without waste; no spoilage from dripping; man-hour conservation; and fire and accident hazard reduction.

Equipment Shorts

HARDSURFACING—Air Reduction Sales Co., 60 E. 42nd St., N. Y. 17, N. Y., has announced the "Automatic Buildup Wire," a wire designed for use prior to final hardfacing on parts such as tractor rollers and idlers, earth moving shovel parts and cabledrums. Designed for use with the submerged wire process, the wire's deposits are said to be sound with ample ductility and form a "perfect" bond with a surface hardfacing material such as "Airco" No. 779.

DRUM-LIFTER—A one-man drum lift is being made by Sterling, Fleischman Co., Broomall, Pa., for use up to 750 lb capacity. Lifting power is supplied by a footoperated hydraulic jack and drums can be raised for pouring to a height of 53 in. The maker says the lift, mounted on spark-proof casters, cannot be overturned, even by two drums stacked vertically. Features: "easy-lock" girdle that grips the drum and permits 360 deg drum rotation; drum-lift arm brakes to hold the drum at any angle.

PLASTIC PIPE—The Alloy Tube Div., Carpenter Steel Co., Union, N. J., is manufacturing rigid unplasticized PVC (polyvinyl chloride) pipe. Two types, a normal impact grade with high chemical resistance and a high impact grade with somewhat less chemical resistance, are being offered. Each can be formed, sawed, threaded, machined, hot gas welded and

How Princess Elkhorn Coal Company

lifies and Saves

with GULF MINING MACHINE LUBRICANT



Extra steps, extra applications, and extra handling cost money. Princess Elkhorn Coal Company has found it can eliminate these costly extras with Gulf Mining Machine Lubricant. This cost-saving lubricant does the entire lubricating job at the face, thus simplifying lubricant storage and handling. It also lessens the danger of application errors. Thus this progressive company avoids the extras—does the job with one grease.

Gulf Mining Machine Lubricant not only replaces several other lubricants, but does a better job because of its heavy body, excellent adhesiveness, and resistance to the washing action of water. You will find that it provides effective protection for plain and antifriction bearings, crawler mechanisms, and gear boxes.

A Gulf Sales Engineer is as near as your telephone. Consult the telephone directory for the number of your local Gulf office and have him demonstrate the many time-saving, cost-cutting advantages of Gulf Mining Machine Lubricant on your equipment.

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THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

COAL AGE . April, 1958

105

Hendrick Quality Steel. . Passes Every Test!

The use of Hendrick H Quality Steel Perforated Plate on vibrating screens can often mean the difference between profit and loss in coal preparation. Hendrick Perforated Metal Plate really stands up under continuous heavy-duty usage . . . screens coal easier, faster and with less time out due to blinding.



Secret of Hendrick's success is our 80 years of experience in selecting and specifying the various analyses of steel best suited for the mining industry. Hendrick perforated H quality steel is supplied in flat, corrugated or stepped with any desired shape and size of perforation. For more information write Hendrick direct.



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Hendrick - Pioneer Perforator of Quality Steel for 80 Years!

How deep is the overburden?

Why guess when these low-cost, easy to operate Acker LD Core Drills tell you Quickly!

Easily! Inexpensively!

- 1. Quality of Coal 2. Thickness of Seam
- 3. Depth of Overburden



Model ID nowered with a 12HP motor for depths to 300'



Model LD powered with a 7HP motor for depths up to 150'.

For simplicity of design and operation you just can't beat the Acker LD. We've kept moving parts to a minimum and eliminated all feed gears or screws. (Elimination of unnecessary parts cuts down weight, too-an advantage when operating in isolated locations.) Our newly designed double tube core barrel retrieves samples even where others fail!

Your choice of power and mounting. Write today for prices and Bulletin 21 CA

ACKER DRILL CO., INC. SCRANTON 3, PA.

solvent cemented. Applications are recommended for mining and smelting.

INDUSTRIAL TRAILER-Yale & Towne Mfg. Co., 11000 Roosevelt Blvd., Philadelphia 15, Pa., is manufacturing an 8,000 lb-capacity industrial trailer. Two features are stressed by the company: longer length (carrying platform 128 in, overall 135% in) and an improved trailer hitch (single pin removal). Equipped with four-wheel steering.

SAFETY GOGGLES-"Airflow," a safety goggle said to be fog-proof by the manufacturer, United States Safety Service Co., 1215 McGee St., Kansas City 6, Mo., can be used whether or not you wear prescription glasses. Ventilation is achieved with more than 10 in of 20 mesh (nickel) screen. Lenses tilt down and in toward the face to permit downward vision without moving the head.

MOBILE RADIO "MIKE"-Motorola Communications & Electronics Inc., 4501 W. Augusta Blvd., Chicago 51, Ill., has introduced a transistorized microphone for mobile radios. A built-in transistor preamplifier boosts output to conventional transmitter input level, eliminating the need for preamplification at the transmitter. Motorola says the technique overcomes noise pickup inherent in mobile installations. The "mike" is interchangeable with Motorola carbon microphones in use, now.

PULLEY LAGGING-A rubber pulley lagging has been developed by Hewitt-Robins, Inc., Stamford, Conn., to overcome pulley slippage on belt conveyors. The lagging has a grooved anti-slip sur-face, something like automobile snow tires, and is reinforced with two layers of fabric backing. It will be traded under the name "Maltese Cross Double Chevron Pulley Lagging."

MAGNETIC VIBRATOR-By combining a permanent magnetic unit with an electro-magnet operating on AC, Eriez Mfg. Co., Erie, Pa., has developed a unit vibrator that operates at 3,600 vpm. The units need no rectifiers. Instead of ham-mering a bin wall, the Eriez unit sets up a "double-diaphragming," or kneeding action, which in effect expands the lower half of a bin while compressing the upper

PROTECTIVE COVERING-"Herculite," a test tube fabric designed for protection and the same general uses as canvas, is being sold by Herculite Protective Fab-rics Inc., Belleville, N. J. Said to be impossible to tear, the material has been proven, the maker says, to be ten times stronger than canvas. It will not support combustion, is waterproof and is unaffected by acids, grease, oil.

FRONT-END LOADER - Tractomotive Corp., Deerfield, Ill., has introduced the TL-11 "Tracto-Loader," a front-end loader that is equipped with front-wheel drive and rear-wheel power steering.

This high-profit performer is now



BETTER THAN EVER

This versatile Caterpillar No. 12 Motor Grader is on the go five days a week on stripping operations at Seminole Coal Corporation's mine, Lenzburg, Ill. It maintains haul roads, cleans the top of the coal, and pushes and pulls loaded railroad cars to help Seminole maintain an average output of 5000 to 6000 tons a day. In addition to traditional Caterpillar ruggedness and freedom from down time, the No. 12 now has new features for even higher production and bigger profits for you:

NOW-TUBELESS TIRES. Available at no extra cost, tubeless tires on CAT* Motor Graders eliminate an estimated 80% of down time caused by tires. Tubeless tires are easier and quicker to mount, hold air longer, run cooler, and give better puncture and blowout protection.

MONEY-SAVING OIL CLUTCH. Specially bonded cork facings bathed in oil can give you 1500 hours without clutch adjustment. Facings wear an average of only 2½ thousandths of an inch per thousand hours of operating time. This means longer clutch life, easier maintenance, reduced down time.

Like all Caterpillar Motor Graders, the new No. 12 is built—not merely assembled—by a single manufacturer. Engine, blade capacity and working speed are carefully balanced for maximum efficiency. And skilled service and Caterpillar parts are quickly available from a single dependable source: your Caterpillar Dealer.

Your dealer will gladly demonstrate such high-production features as unexcelled operator visibility from the seat, quick-change blade positioning and positive, non-creep mechanical controls. He'll help you select the model—No. 12, No. 112 or No. 212—best suited to your needs. Call your Caterpillar Dealer today.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR'

Caterpiller and Cat are Registered Trademarks of Caterpiller Tractor Co.

99% OF ALL CAT MOTOR GRADERS ARE STILL IN USE Carrying a 1% cu yd bucket, the TL-11 is designed to operate in confined areas. Bucket tip-back is 41 deg at carrying height, 22 deg at ground level. Either a 4-cylinder gasoline engine or 77 hp, 6cylinder diesel can be installed. Electrical system, 12 v.

CONCRETE ADDITIVE — "Concretdense," an additive that is said to make concrete water-tight, non-dusting and abrasion resistant, is being manufactured by the Flexrock Co., 3601 Filbert St., Philadelphia 1, Pa. The maker says that where dryers cannot be used, the material is exceptionally serviceable, since it should be used where a quick finish is necessary. Also recommended as an antifreeze. Non-corroding, colorless effect.

SELF-ALIGNING BEARING – A low-cost self-aligning bearing has been developed by the Cleveland Graphite Bronze Co., Div. Clevite Corp. Named the "Clev-Align," the bearing can be used in construction machinery, blower fans and conveyors. Made in two basic sizes; shaft diameters are ¾ in to 1¾ in. Feature: continuous self-alignment of variations up to ½ in per ft of distance between bearing centers.

EARTHMOVERS REDESIGNED - Design changes in the earthmoving "Pay-

scraper" line of International Harvester, 180 N. Michigan Ave., Chicago 1, Ill., have increased Model 75's capacity to 20 cu yd heaped and Model 55's capacity to 14 cu yd heaped. Other changes, according to the company: (1) straight-back bowl; (2) lower draft frame; (3) greater visibility; (4) new cerametallic clutch facing on Model 75; (5) higher apron lift; (6) bigger push block.

OVERHEAD CLOTHES STORAGE—An overhead "Lockerbasket," manufactured by The Moore Co., 1036 Quarrier St., Charleston, W. Va., is designed to utilize so-called wasted space in locker rooms. The six-hook baskets carry personal effects, while "Clothes-Lok" coat hooks anchor-lock clothing to the unit. Advantages: locker room size reduction; contents security; and clothing ventilation.

METAL BENDING—A portable bender that reportedly does the work of four ordinary benders is being manufactured by the J. B. Sebrell Corp., 300 S. Los Angeles St., Los Angeles 13, Calif. The unit will bend steel flat bar, round and rectangular steel and reinforcing steel bars, pipe, and copper or aluminum tubing. The manufacturer says that since the bender is portable and can be taken to a particular job, bending costs will often be cut up to 95%.

ALUMINUM WIRE—Coleman Cable & Wire Co., 4515 W. Addison St., Chicago 41, Ill., is manufacturing No. 18 aluminum connecting wire for blasting. Said to be electrically comparable to No. 20 copper, the aluminum wire, according to Coleman, will save buyers 32% in basic costs and, because of its lighter weight save 37% in shipping costs. Plastic insulation.

Free Bulletins

FILM ON DUMPING—Euclid Div., General Motors Corp., Cleveland 17, Ohio, is distributing a 16mm color and sound film featuring the company's Model UD 10-ton rear dump. The film, "Under the Shovel," shows job applications. The Model UD is the smallest Euclid rear dump the company manufactures. Time, 16 min.

PLASTIC PIPE—Joseph T. Ryerson & Son, Inc., Box 8000-A, Chicago 80, Ill., has prepared Bulletin 80-3 to describe "Ryertex-Omicron PVC" (polyvinyl chloride), a rigid type unplasticized pipe. The pipe is said to defy industrial chemicals and to be non-sparking. The company says the pipe weighs about ½6 the weight of stainless steel and costs less.

POWER SOURCE—A combination 200 amp welder and 4 kva standby AC power unit is described and illustrated in a bulletin published by the manufacturer, Lincoln Electric Co., Cleveland 17, Ohio. Named the "Weldanpower," the unit is constructed to supply current for both





They're drilling Limestone

for NEXT-TO-NOTHING A YARD







In a Texas limestone quarry, a Joy Model 225 "Blastair" Drill set the following performance record . . . with a drilling cost of less than two cents a cubic yard:

Bit Size	. 61/4"
Footage Per Shift	. 300
Labor Cost Per Shift (Driller & Helper) \$20.80	
Fuel Cost Per Shift 5.00	
Lubricating Oil Cost Per Shift 2.00	
Total Labor & Fuel Cost Per Shift	\$27.80
Labor & Fuel Cost Per Foot \$.093	
Bit Cost Per Foot	
Total Labor, Fuel, Bit Cost Per Foot	.227
Cubic Yards Broken Per Foot	13
Total Drilling Costs Per Cubic Yard	.0174

Performance figures will vary, of course, with other formations. However, they show the possibilities of cutting your drilling costs with this outstanding

The "Blastair" is a truck-mounted, rotary, "airblast" drill. It is a fast mover between holes and is easy to set up in drilling position. Its outstanding features include hydraulic automatic chuck, heavyduty hoisting drum, oil-bath chain-case power unit, and rugged sectional mast. It is a real top-performance, low-maintenance machine that is ideal for the rough jobs of quarry and open-cut mine drilling. Find out for yourself how the Joy "Blastair" can

cut drilling costs on your job as it did this. Write today for Bulletin RM-709 to Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa. In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario.

GASOLINE OR DIESEL DRIVE . 61/4" MAX. DIA. HOLE 20' FEED . DRAG OR ROTARY-CONE TYPE BITS







MANUFACTURER OF ROTARY BLAST HOLE DRILLS

welding and power at the same time. Seven tap positions are supplied for welding. As a power supply the unit delivers 230/115 v, 60 cycle, single phase current.

ROTARY FEEDER-Bulletin P-55, published by the Prater Pulverizer Co., 1515 S. 55th Court, Chicago 50, Ill., covers the company's entire line of rotary airlock feeders. Constructed of cast iron, bronze, stainless steel and aluminum, the "airlocks" are built in three sizes and types. Selections and uses are described.

SELF-ADJUSTING BRAKE-A booklet entitled "Brake Adjusting Completely Elim'nated" has been prepared by the Westinghouse Electric Corp. to describe construction, operation and applications of the company's DC Magnetic Brake, Westinghouse says the brake can be applied to AC motors by using rectifiers. Booklet B-6548, P. O. Box 2099, Pittsburgh 30,

EARTHMOVERS-The 102 hp 6-D and the 140 hp 7-D, both motor graders and both manufactured by Huber-Warco Co., Marion, Ohio, are the subjects of a new bulletin (HWG-521) published by the company. Sections of the bulletin deal with design, history of motor graders and features of the 6-D and 7-D. The back cover shows the complete line of Huber-Warco road machinery.

PUMPS-Wheeler-Economy Type pumps for medium and high head services are described in catalog A-155 by the C. H. Wheeler Mfg. Co., 19th & Lehigh, Philadelphia 32, Pa. Design cross sections are shown for bottom suction and side suction types. Construction details have also been included.

REVERSING MOTORS-The Louis Allis Co., Milwaukee 7, Wis., is distributing Bulletin 1800, describing "Louis Allis Rapid Reversing Motors." A cutaway view shows construction of a blowercooled, reversing motor which, the company says, is capable of more than 200 idle reversals a minute.

BELT IDLER-Pictures and text are used bell index are used to describe Link-Belt's Series 50 ball bearing belt conveyor idler in Folder 2516. The Series 50 idlers, "new from base to ball bearings," are made in two types—greaseable and factory sealed—for seven belt widths (14 to 16 in). Dept. PR, 307 N. Michigan Ave., Chicago 1,

SCALPING SCREEN – Allis-Chalmers ROM vibrating screen (Model XXH) is the subject of Bulletin 07B8368. Ten features are listed; among them are twobearing construction with extra-large bearings, built-in stabilizers and a removable cartridge type mcchanism. Allis-Chalmers Mfg. Co., 968 S. 70th St., Milwaukee,

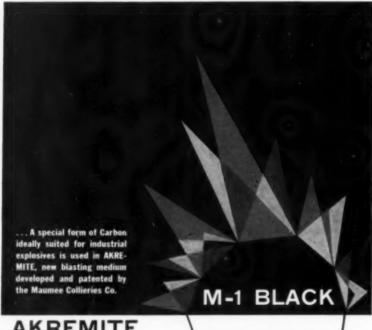
MOTOR GRADER-Catalog MS-459, published by Allis-Chalmers Mfg. Co., Milwaukee, Wis., gives design, engineering and construction information about the company's 50 hp Model D motor graders. Graphs, photos and cut-aways illustrate both gasoline and diesel powered units.

FLOOR ARMOR-The Klemp Metal Grating Corp., Dept. KL, 6601 S. Melvina Ave., Chicago 38, Ill., is distributing a pamphlet describing "Hexteel," a heavy duty floor armor, and "Floorsteel," a flexible armor. "Hexteel" is designed to take the force of rolling loads, "Floorsteel" to protect irregular surfaces.

V-BELT DRIVE-The origin, history and development of the multiple V-belt drive are presented in a 36-page pocket size booklet published by Allis-Chalmers Mfg. Co. Also covered is the engineering evolution of standards for V-belt drive. Bulletin 20E8297, 968 S. 70th St., Milwaukee. Wis

SOCKET CAP SCREWS-The Bristol Co., Socket Screw Div., Waterbury 20, Conn., is distributing a bulletin on the company's complete line of socket cap screws. Bulletin DM737 shows typical installations of cap screws, which are made in both hexagonal and multiple spline sockets.

ATMOSPHERE RECORDER - Bulletin H1008, published by The Bristol Co., Waterbury 20, Conn., contains descrip-



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assures efficient, safe and economical results in strip mining. Millions of pounds have been shot to date without misfire or accident.

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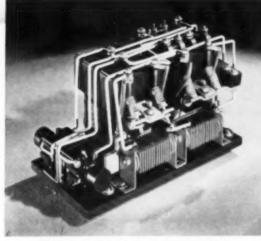
is the carbon to use.



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File x/p 700

National Mine Service Company

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The NEW NATIONAL MINE

Meeting every requirement for safe, effective, and dependable performance, the National Mine GROUND SENTINEL provides constant protection against groundfault hazards for your mobile, off-track mining equipment. Compact, self-contained in an explosion-proof, heavy steel case, the Sentinel instantly shuts down the machine and opens all control circuits in event of insulation failureguards against shock hazards through differences of potential between frames of adjacent equipment or equipment and ground - protects against ignition hazards resulting from transfer of electric currents between frames of equipment operating near working surface. Write today for the GROUND SENTINEL facts!

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SPEED MAINTENANCE WORK





HERE'S POWER and versatility to speed up your bigger nut turning jobs. The quickly interchangeable combination of straight Boxockets, offset Boxockets and Open Ends gives your mechanics a choice of wrench heads to reach nuts in locations with different clearance problems. Wrench heads can be used without handles to run down nuts quickly, and the handle slipped on for final tightening. All wrenches have a handle stop to easily locate the locking button. Wrench and handle lock solidly-can't be separated accidentally-an important safety factor. Available in a wide range of wrench sizes and handles.

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tions of portable recorders designed to measure relative humidity and temperature. Examples of records made by the "Thermo-Humidigraph" are included.

DIAMOND BITS—Bulletin 320-1, published by Sprague & Henwood Inc., 221 W. Olive St., Scranton 2, Pa., describes the company's line of "Oriented" diamond bits. Included are coring and non-coring bits, casing bits, casing shoe bits, reaming shells and impregnated coring bits.

GEARMOTORS—Completely redesigned gearheads have been installed in a new line of gearmotors by the manufacturer, Reliance Electric & Engineering Co., according to Bulletin E-2408. Entitled "Reduce Speed," the bulletin illustrates a selection of types, mountings, enclosures and ratios. Design, engineering and specifications are featured. 1088 Ivanhoe Rd., Cleveland 10, Ohio.

AIR COMPRESSORS—The Kellogg Div., American Brake Shoe Co., has prepared a folder on its Utility Line of air compressors. The folder contains information on 19 models (½ to 1¼ hp), ranging from 125 to 150 psi with various types of drives. Dept. A, 230 Park Ave., New York 17, N. Y.

PRESSURE VESSEL STEELS-"Comparison of Carbon & Alloy Steels for Pressure Vessels," a booklet published by the Lukens Steel Co., Coatesville, Pa., attempts to simplify plate steel selection with graphs that compare the cost of specific steels against particular service requirements of pressure and tempera-ture. Of the nine graphs, the first plots allowable stress against temperature for the various carbon and alloy steels in the text. The remaining eight graphs are paired according to maximum service temperatures in increments of 100 from 650 to 950 deg F. The first graph of each pair plots shell thickness and weight per sq ft against PR values (psi x shell radius in in). The second plots cost per sq ft of shell against PR.

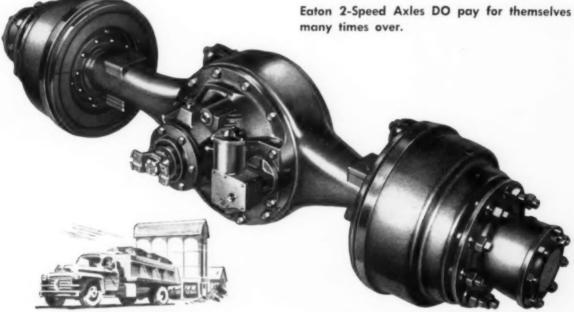
OUTSIDE PIPE INSULATION—Johns-Manville, 22 E. 40th St., New York, N. Y., is distributing "Thermobestos Pipe & Block Insulation," a booklet giving information on a hydrous calcium silicate insulation for hot outdoor piping and process equipment operating at temperatures up to 1,200 deg F. "Thermobestos," according to the booklet, is made from asbestos, diatomaceous silica and lime. It is said to be strong, light, chemically stable and non-inflammable.

GROUND FAULT DETECTOR—Ensign Electric & Mfg. Co., Huntington, W. Va., has announced Bulletin 3000 which describes the company's "Ground-i-cator." Designed to meet requirements of the U. S. Bureau of Mines Schedule 2F, the detector is said to provide effective, continuous ground fault protection to off-track equipment with Type W cable. Sold as a unit package with cable, hose and extra gland.

Eaton 2-Speed Axles give Truckers these Important Benefits—

- · POWER WHEN NEEDED
- . SPEED WHEN WANTED
- LOWER OPERATING COSTS
- · LOWER MAINTENANCE COST
- LONGER TRUCK LIFE
- HIGHER TRADE-IN VALUE

With Eaton 2-Speed Axles drivers select the gear ratio best suited to road, load, and traffic conditions—the ratio for maximum economy, safety, and maneuverability. Quicker trips with full loads mean more payload miles at lower cost per mile. Engines run in the most efficient and economical speed range, reducing stress and wear on engines and all power transmitting parts. Trucks stay on the job, out of the repair shop. Thousands of miles are added to vehicle life; trucks are worth more when they



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COAL AGE . April, 1956

NEWS ROUND-UP

AGE Plans Boost Of 2.6 Million Kw

American Gas & Electric Co. (AGE), whose 12 major power plants dot the lands of seven states, produce 4 million kw and burn 9 million tons of coal a yr, announced a \$700 million expansion plan last month. Already the world's biggest privately owned power producer, AGE plans to add 2,600,000 more private power kw during the next 5 yr for a total generating capability of 6,600,000 kw by 1960.

The program, announced as AGE was celebrating its 50th yr of age, will give the company more generating capacity than all the hydro capacity constructed by TVA during its 23 yr of existence.

Eight stations with capability totaling 1,700,000 kw are already under construction or will be started this month (box). The remaining 900,000 kw, for which details are still unannounced, will be started by mid-1956 and completed between 1959-1960.

For coal, the entire expansion means a substantial increase in AGE's fuel needs. Exactly how much, no one can say yet, but the tonnage probably can be measured in many millions. The eight units already under construction are expected to account for 4,750,000 tons. AGE says, however, that to try adding the new tonnage to the more than 9 million tons

it already burns would be impractical, since the company doesn't know that it will be using all its present power units by 1958. In other words, AGE says, the least efficient units will not be in operation at all times.

Unlike Topsy, who just grew and grew, American Gas & Electric, always knows where it is growing. Guided by its powerhouse president, Philip Sporn, an Austrianborn, scholarly kind of executive who started his career in utilities as a lamplighter in Manhattan (he's 59), AGE has boosted operating revenues \$15 million a yr since 1949 until last yr, it reached \$258 million.

The new expansion is a calculated one. It comes on the heels of a 10-yr program in which AGE spent \$785 million and added 2,245,000 kw to its capacity. But even more capability is needed. Last yr the company's domestic electric power consumption leaped 12% among the 2,319 small communities it serves. Heavy power-consuming industries, particularly in Ohio, West Virginia, Tennessee and Virginia, are becoming the hungriest of all. e.g., Henry Kaiser's \$120 million aluminum plant near Ravenswood, W. Va. (Coal Age, January, 1956, p 108).

Mr. Sporn, a man who likes to deal in precise figures, has doubled the company's capacity since 1949, chiefly with technical advances. A 330,000-v network of transmission lines suspended from Eiffel Tower-like transmission towers were the product of his imagination. He will soon begin operating the first U. S. power

1,700,000 4,750,000

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plant to use extremely high pressure steam to generate power (Philo, Ohio).

Although he is confident that nuclear energy will not be economically competitive to his company for some 20 yr, Mr. Sporn has made himself an authority on the atom's use in industry. During the atoms-for-peace conference last summer in Geneva, Switzerland, he was a member of the U. S. delegation. He is also president of Nuclear Power Group, Inc., a utility-backed atom research organization that is spending \$15 million to help develop Commonwealth Edison's 180,000 kw reactor near Chicago.

About AGE's newest expansion in coalfired plants he says that the move was prompted by "natural growth, area development and the utilization of our electric power system," which, he said, "will increase four-fold over the next 20 yr. This building program is the first step in quadrupling our facilities."

The AGE system comprises these electric utility operating companies: Appalachian Electric Power Co., Virginia and West Virginia; Indiana & Michigan Electric Co., Indiana and Michigan; Kentucky Power Co., Kentucky; Kingsport Utilities, Inc., Tennessee; Ohio Power Co., Ohio; and Wheeling Electric Co., West Virginia.

Vest Virginia. No. 125,000 348,000 West Virginia. Safety Letup, USBM Says.

Last year 413 miners were killed mining coal (Coal Age, February 1956, p 118). Last month, because a record 56 more men had died in January, most of them under falling mine roofs, the United States Bureau of Mines assigned roof control experts from its field offices to study timbering methods and to advise operators in ways of improving timbering practices.

In Wake of High Death Toll

The high January toll had rivaled a record 59-man death rate set in April, 1952. Compared with the January, 1955, death rate, the new toll showed that more

Expanding AGE

UNIT	LOCATION	COMPANY	OPERATION DATE	KW SIZE	COAL CONSUMP- TION
Philo Unit 6	Philo, Ohio	Ohio Power	July, 1956	125,000	348,000
Glen Lyn Unit 6	Glen Lyn, Va.	Appalachian Electric	December, 1956	225,000	606,000
Muskingum Units 3 and 4	Beverly, Ohio	Ohio Power	1957	225,000	1,318,000
Kammer Units 1 and 2	Captina, W. Va.	(footnote "a")	1958	225,000	1,214,000
Clinch River Units 1 and 2	Carbo. Va.	Appalachian Electric	1958	225,000	1,264,000

"—This is average annual coal consumption at normal operation.

(a)—Unit I will be owned by Olin Mathieson Generating Corp., Unit 2 will be owned by Ohio Power Co., which will operate both units.

Macwhyte Internal Lubrication gives you rope prepared especially for your service conditions—designed to resist abrasion, internal friction, and corrosion on slope hoists.

Here's special rope ... made for mining!

Monarch Whyte Strand wire rope is available in the correct type and size you need for your equipment. This rope is made by Macwhyte to give you long, heavy-duty service on draglines, strip shovels, mine hoists, slope hoists, mining machines, loaders, and other mining equipment.

Monarch Whyte Strand is supplied properly PREformed for flexibility, and properly lubricated, depending upon the use of the rope, to resist abrasion, corrosion, and give maximum service.

Give Monarch Whyte Strand a chance to serve you. You will be more than pleased with its performance. Your Macwhyte distributor is stocked for immediate delivery.

Monarch Whyte Strand Bulletin 5425 is available from your distributor or write direct to Macwhyte Company.

MACWHYTE MINING

Macwhyte Company, 2931 Fourteenth Avenue, Kenosha, Wisconsin

Manufacturers of: Internally Lubricated PREformed Wire Rope, Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal, Stainless Steel Wire Rope, and Wire Rope Assemblies. Special catalogs available.

New York 4, 35 Water St.
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Macwhyte PREforming gives MONARCH WHYTE STRAND the flexibility for improved handling and long service. There's a type and size for all drag line equipment.



MONARCH WHYTE STRAND is made by Macwhyte in every wire rope classification to provide the correct size and construction for all strip mining machines.

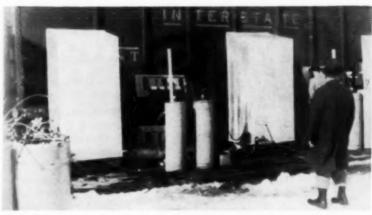
than double the number of men had been killed in roof falls (35 in January, 1956; 17 in January, 1955). Twenty-nine of the January, 1956, deaths occurred in bituminous roof falls, 13 in anthracite. In January, 1955, 13 had been killed in bituminous roof falls, four in anthracite.

With the order assigning roof control experts to study timbering methods, Thomas H. Miller, acting director of the USBM, urged mine operators and miners to follow safety practices with rigid application. "The fact that 63% of all fatalities were the result of falls of roof and coal points to a dangerous relaxation in safety practices," Mr. Miller warned. "We urge that mine operators Mr. Miller insist that places be adequately timbered or roof-bolted and that mine workers assure themselves that they are carrying out timbering standards and not taking undue (Late reports from the USBM show that 31 men were killed in February. Of the total 19 died in roof falls.)

Coal Official Charges Rails With "Wasteful" Practices

Although the 6% freight rate boost granted by the Interstate Commerce Commission last month applied among a wide range of products, one of the most immediate reactions to the boost, which would give rails extra revenue totaling \$400 million (\$50 million from coal), came from the vice president of a coal corporation who charged the rail-roads were being "wasteful."

A. W. Vogtle, vice president in charge of sales and traffic for the DeBardeleben Coal Corp., Birmingham, Ala., in a speech delivered at the 18th annual American Power Conference in Chicago,



COAL WARMER-The odd looking bank of equipment above is the newest method for thawing frozen coal. The equipment is bombarding coal inside the rail car with infra-red heat. Another unit is doing the same thing on the other side of the car. The process calls for running a coal car between two banks of infra-red units. Natural or artificial gas is piped in to the units. The gas burns at the face of small ceramics and gives off infra-red heat. Perfection Industries, the manufacturer, makes no spectacular claims, but says the process should be cheaper, more efficient and less damaging to the sides of rail cars than oil burners and torches.

charged that "an intolerable excess freight cost of \$1 billion a yr is being imposed on the carload freight shippers of our country because of wasteful and unsound practices of our American rail-

The unsound practices, Mr. Vogtle said, were passenger services that lost \$700 million a yr; merchandise freight service-\$100 million; and reduced charges on government freight-\$200 million.

(Eastern and western railroads gave

notice March 22 they propose to increase basic passenger fares by 5% May 1. The notice came after an announcement by the Interstate Commerce Commission of a general investigation into the railroads' passenger losses. Again, as in the freight rate rise, the rairoads will see to sidetrack certain procedural steps that would prevent increasing fares immediately.)

Some of the blame, according to Mr. Vogtle, lay with the ICC and state commerce commissions. "The regulatory agencies," he said, "permit the railroads to apply a cost plus system, disregarding waste and inefficiency, to bring income up to outgo by increasing carload freight rates to absorb deficits."

Last month's freight increase granted a general boost of 6% in all basic rates other than coal and coke and a few other specific commodities. The ICC authorized a maximum increase in line-haul rates on anthracite and bituminous coal (except lignite), and coke, in carloads of 6%, but not in excess of 15c a ton. Lignite rates were increased 3%, or a maximum

of 7c a ton.

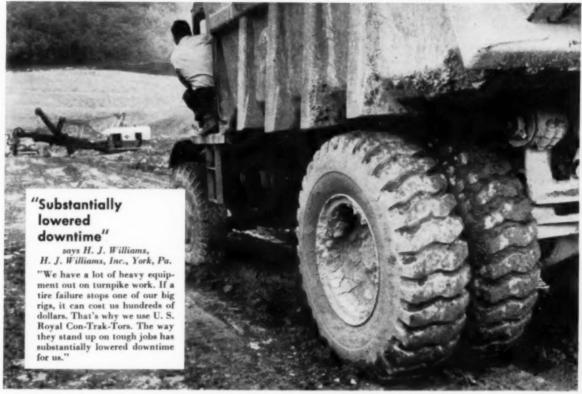
DEMONSTRATION BY CHAMPIONS-U. S. Steel's Gary, W. Va., first aid team, top awards winner at the recent National First Aid Contest in Knoxville, Tenn., demonstrates technique before 200 surgeons, nurses and other medical personnel at a meeting of the Southwestern Pennsylvania Chapter of the American College of Surgeons. The team coped with "victims" involved in three simulated highway accidents. Members are John Dickerson (left), captain; William Hightower; Albert Wagers, Howard Myers, Stephen Solonko, John Popovich, Donald Riffe.

Three Companies Post Engineering Scholarships

As the search for engineers among the nation's men becomes a tighter and tighter race industries everywhere are tossing more than one financial lure in the way of prospective employees. One of these lures, the college scholarship, or semi-subsidized education, has more than paid many employers back their initial investment. Last month three coal companies moved into the race for engineers with scholarship bait. Consolidation Coal

(Continued on p 134)

Costly Downtime <u>Drops!</u>



Approach to south portal of T. J. Evans Tunnel, on the Pennsylvania Turnpike near Allentown,

U.S.ROYAL

<u>GOLFILLIZATOR</u>

If, like Mr. Williams, you use heavy-duty trucks, you can reduce your equipment downtime and your operating cost with the U. S. Royal ConTrak-Tor. Here is why.

This tire's Nylon cord carcass stands up to vicious shocks, fights off sharp rocks and snags. It has triple impact protection—extra cushioning rubber between plies, double shockpads under the tread, extra-tough construction at the crown.

Its full-lug traction pulls right through toughest going, reduces sideslip to an absolute minimum, just won't bog down.

Your U. S. Royal Dealer now has the U. S. Royal Con-Trak-Tor in your size. Have him put it on your wheels—and prove to yourself why men like H. J. Williams report that both down-time rates and operating costs *drop* with this great tire!



United States Rubber

Foreign News

LUXEMBOURG

Member countries of the European Coal and Steel Community (ECSC) will need 26 to 28 million metric tons of coal from the United States this year, according to an estimate made by the ECSC's High Authority. This compares to 17,000,000 tons imported from the United States in 1955 by the six member nations (France, West Germany, Italy, Belgium, The Netherlands and Luxembourg). The figure also represents an increase over a previous estimate (25,000,000 tons) that was made by Rene Mayer, President of the ECSC. The primary reason for the increased need is expanded demand and a sharp export reduction by Great Britain, which furnished the Community with 4,300,000 tons last year. Domestic production is ex-pected to rise by only 4,000,000 tons in

A committee reporting to the European Coal and Steel Community has concluded that petroleum must meet the huge fuel expansion requirement expected by 1975, after which, the committee said, nuclear power would take over. It proposed to the ECSC that nuclear energy be organized and its responsibilities be added to the responsibilities of the Community. The proposal suggests for the member countries (Belgium, Holland, Luxembourg, Italy, Germany, France) a common market for all forms of primary and secondary energy and a market in equipment for all branches of the energy industry, e. g., this would mean France could import duty-free German mining machinery or refinery equipment but charge a duty on a similar U. S. product. The committee's report also recommended action by the six nations to prospect for oil and natural gas within colonial territories. A



POLISH EXCAVATOR here is preparing Poland's Konin strip mine for exploitation. The machine, the DS 1120, was developed in East Germany and excavates 1900 cu yd per hr, according to the Polish Embassy, Washington, D. C. The embassy reports that Poland is developing 60 new brown coal operations such as the one above.

discussion of the recommendation is expected in Strasbourg May 8.

POLAND

Hard coal deposits, estimated at 8,000 million metric tons, will provide an 800-yr production of 100 million tons a year, according to Poland's official paper, "Zeycie Gospodareze," The newspaper says that Poland is fifth in the world's line-up of coal producers. The other countries are the United States, the Soviet Union, Great Britain and West Germany. Red China claims sixth place.

Poland and Great Britain have signed a new trade agreement covering commerce between the two countries in 1956, according to the Polish Embassy in the United States. Under the agreement, Poland will send coal to Britain for machinery and industrial equipment, cars, trucks and other goods.

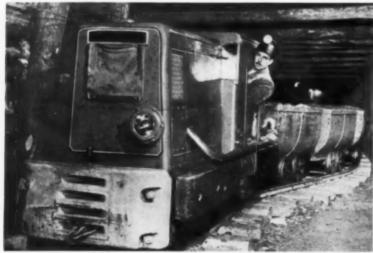
ARGENTINA

By 1960, Argentina will practically have ceased to be a customer of world coal markets, according to a recent announcement by the Minister of Industry, Carlos A. Alsogaray. But before that happens she will have to spend some 900 million pesos (about 47.8 million dollars at the current 18 to 1 exchange rate) on mining machinery and on coal transportation facilities.

The Rio Turbio coal mines in Argentina's far south, will provide the country with a million tons of "acceptable" quality coal beginning in 1959, against national requirements of some 1.5 million tons a year, Mr. Alsogaray said, and thereafter production will rise steadily to the point, in 1960, when the country will be largely self-sufficient in this commodity.

Describing handling of the Rio Turbio coal deposits as a "typical example of the operational failures of the deposed government," the Minister pointed out that in spite of all the propaganda put out about this project by the deposed regime, the mines were supplying only 50,000 tons of coal a year at the time of the September revolution last year. In view of the fact that 500 million pesos (35.3 million dollars at rates of exchange then applicable) had been spent on the project with such small results,

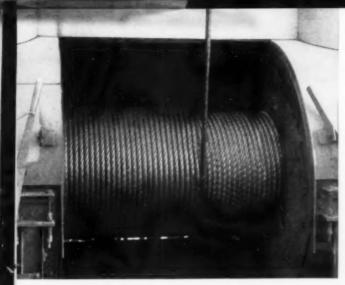
(Continued on p 122)



ARGENTINE MINE (Rio Turbio) transporting equipment includes diesel.

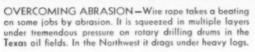
Despite huge investment by Juan Peron (\$35.3 million) during 10 yr period,

Rio Turbio output is only 50,000 metric tons a yr.











In this Arizona mine it is scraped over rocks to operate a slusher. Everywhere it is rubbed severely on winches that do not wind smooth. Under such conditions Red-Strand 6 x 19 Seale wire rope will last longer and save you money.

What can <u>you</u> do <u>better</u> with 6x19 Seale Red-Strand?





6 x 19 Seale has the same strength and weight as the more frequently used 6 x 19 Filler Wire, but the arrangement and size of the wires is different. You can see in the diagrams that the outer wires are fewer in number and larger in size. They provide high resistance to abrasion and greater wearing quality with somewhat less flexibility.

It's the perfect rope for certain jobs. Would it solve a problem for you? Be less trouble? Save more money? A Leschen man is near you. Perhaps he can help.

Send for the 64-page Leschen Wire Rope Handbook. It describes Seale and all other Red-Strand wire rope constructions.

LESCHEN WIRE ROPE DIVISION
H. K. PORTER COMPANY, INC.

St. Louis 12, Missouri



Coal Convention Program

American Mining Congress, May 7-9, Hotel Netherland Plaza, Cincinnati, Ohio

MONDAY, MAY 7

9:30 am Pre-session motion picture

10:00 am OPENING SESSION

Opening of Convention: G. A. Shoemaker, executive vice president, Pittsburgh Consolidation Coal Co., and national chairman, program committee. A Practical Look Into Coal's Future, R. E. Salvati, president, Island Creek Coal Co., Huntington, W. Va. The Railroads and the Coal Industry, W. W. Patchell, vice president, research and development, Pennsylvania Railroad Co., Pittsburgh, Pa. Congress and the Coal Industry, Hon. John P. Saylor, member of Congress from Pennsylvania.

12:15 nm LUNCHEON

Presiding: L. C. Campbell, vice president, Eastern Gas & Fuel Associates; chairman, coal div., American Mining Congress, Address: Sources of Energy for Electric Generation in the Next Two Decades, Philip Sporn, president, American Gas & Electric Service Corp., New York, N. Y.

1:45 pm Pre-session motion picture, Glass and You, a history of glass making.

2:15 pm STRIP MINING

Chairman: G. H. Utterback, secretary-treasurer, United Electric Coal Cos., Chicago, Ill. Engineering Development and Economics of the 60-Yd Shovel, James Hyslop, president, Hanna Coal Co., St. Clairsville, Ohio. Discussion: A. F. Busick, vice president, Marion Power Shovel Co., Marion, Ohio. Time Study on Stripping Shovels, William W. Youngblood, superintendent, mine No. 2, Middand Electric Coal Corp., Framington, Ill. Truck Haulage With Large and Small Units, W. C. Spencer, assistant chief engineer, Pittsburg & Midway Coal Mining Co., Pittsburg, Kansas. Discussion: Fred Bramer, equipment superintendent, Enos Coal Mining Co., Oakland City, Ind.

1:45 pm Pre-session motion picture, Costa Rica, a travelogue.

2:15 pm MAINTENANCE

Chairman: R. R. Williams, Jr., manager mining dept., Colorado Fuel & Iron Co., Pueblo, Colo. A Modern Maintenance Organization, Donald B. Shupe, mine superintendent, Eastern Gas & Fuel Associates, Wharton, W. Va. Discussion: Mine Lighting Improves Safety, Production and Working Conditions, S. P. Carter, superintendent maintenance, coal div., Armco Steel Corp., Montcoal, W. Va. Discussion: Robert E. Havener, electrical engineer, Mine Safety Appliances Co., Pittsburgh, Pa. Maintenance of Ventilating and Power Conversion Equipment, B. R. Walburn, general master mechanic, Vesta-Shannopin Div., J & L Steel Corp., California, Pa.

2:15 pm Annual Meeting, Manufacturers Div.

TUESDAY, MAY 8

9:30 am Pre-session motion picture, Steel Spans the Chesapeake, Bethlehem Steel Co.

10:00 am CONTINUOUS MINING

Chairman: F. Earle Snarr, vice president, Freeman Coal Mining Co., Chicago, Ill. Continuous Mining With Extensible Belts, Michael Yonko, general manager, Powhatan Mining Co., Powhatan Point, Ohio. Continuous Mining in Low Coal, E. H. Roberts, superintendent maintenance, and G. W. Lockin, production engineer, Inland Steel Co., Wheelwright, Ky. Five Years of Continuous Mining, Robert Billings, assistant to production manager, Rochester & Pittsburgh Coal Co., Indiana, Pa. The Wilcox Miner, R. N. Morris, assistant to vice president, C. H. Mead Coal Co., Div. of North American Coal & Dock Co., East Gulf, W. Va.

9:30 am Pre-session motion picture

10:00 am COAL PREPARATION

Chairman: W. W. Everett, vice president, Glen Alden Corp., Wilkes-Barre, Pa. Washery Water Clarification to Prevent Stream Pollution, Matthew Turkovich, director of preparation, Island Creek Coal Co., Holden, W. Va. Discussion: John Griffen, coal & coke consultant, Pittsburgh, Pa. The Joanne Cleaning Plant, C. C. Cornelius, vice president, operations, Baton Coal Co., Pittsburgh, Pa. Barge Loading Systems, D. H. McFadden, assistant chief engineer, Ayrshire Collieries Corp., Indianapolis, Ind. Discussion: John Donan, consulting engineer, Madisonville, Ky.

12:15 pm LUNCHEON

Presiding: Guy V. Woody, Allis-Chalmers Mfg. Co., chairman, manufacturer's div., American Mining Congress. Address: Highlights in the World of Sports, Red Smith, sports columnist.

1:45 pm Pre-session motion picture, The Sun Goes North, Florida Citrus Commission.

2:15 pm ROOF SUPPORT

Chairman: P. L. Shields, president, Spring Canyon Coal Co., Salt Lake City, Utah. Pillar Mining Making High Recovery, H. A. Cassell, division superintendent, Pocahontas Fuel Co., Pocahontas, Va. Discussion: Paul Gill, chief mining engineer, Clearfield Bituminous Coal Corp., Indiana, Pa. Symposium on Roof Bolting—Roof Bolting Machines, Robert Fletcher, vice president, J. H. Fletcher & Co., Huntington, W. Va. Methods at Jenkins, Ky., M. E. Prunty, safety director, Consolidation Coal Co. (Ky.), Jenkins, Ky. Bolting to Increase Safety, E. M. Thomas, managing engineer, charge roof control, U. S. Bureau of Mines, Washington, D. C. Advantages of Bolting, Wm. J. McCullough, safety director, Snow Hill Coal Corp., Terre Haute, Ind.

1:45 pm Pre-session motion picture, Horizon Unlimited, U. S. Navy Rocket film.

2:15 pm INDUSTRIAL ENGINEERING

Chairman: J. A. Brookes, general manager, Mather Collieries, Pickands Mather & Co., Mather, Pa. Iudustrial Engineering and Cost Controls. An Executive Viewpoint, H. E. Jones, Jr., executive vice-president, Amherst Coal Co., Lundale, W. Va. An Operating Viewpoint, Ralph B. Dean, administrative assistant, The Lorado Coal Mining Co., Columbus, Ohio. Discussion: John W. Straton, director of industrial engineering, Princess Elkhorn Coal Co., David, Ky. Discussion: Walter Weaver, assistant mining industrial engineer, Vesta-Shannopin Div., J & L. Steel Corp., California, Pa. An Analysis of Industrial Engineering As Applied to Coal Mining, John H. Gooch, management consultant, Ingle Coal Co., Elberfeld, Ind. Discussion:

WEDNESDAY, MAY 9

9:30 am Pre-session motion picture, The Suspension Bridge, U. S. Steel Corp.

10:00 am COAL PREPARATION

Chairman: James C. Gray, vice president, coal div., U. S. Steel Corp., Pittsburgh, Pa. Salvaging Coal From Washery Rejects, H. L. Beattie, vice president, Elk River Coal & Lumber Co., Widen, W. Va. L. I. Cothern, director of engineering, Jewell Ridge Coal Corp., Tazewell, Va. The Corbin, Ky., Cleaning Plant, Andrew E. Hamlet, superintendent, Coal Cleaning Plant, U. S. Steel Corp., Corbin, Ky. The Buckheart Preparation Plant, Andrew J. Gaber, preparation engineer, The United Electric Coal Companies, Canton, Ill.

9:30 am Pre-session motion picture, This Is Lumber, West Coast Lumbermen's Assn.

10:00 am HAULAGE AND POWER

Chairman: V. D. Picklesimer, vice president, South East Coal Co., Seco, Ky. Fire Resistant Mine Conveyor Belts: Fire Resistant Belt Construction, J. L. Thornton, manager belting sales, The Goodyear Tire & Rubber Co., Inc., Akron, Ohio. Electrical Protective Devices, J. H. Nash, electrical engineer, Ensign Electric & Manufacturing Co., Huntington, W. Va. Prevention of Conveyor-Belt Fires, S. P. Polack, health and safety engineer, U. S. Bureau of Mines, Pittsburgh, Pa. Automation of Mine Haulage, W. R. Morton, application engineer—mining, General Electric Co., Schenectady, N. Y. Trends in Underground Power, F. R. Sell, senior industrial power engineer, West Penn Power Co., Greensburg, Pa.; C. B. Peck, Jr., manager industrial sales, Anaconda Wire & Cable Co., New York, N. Y.

1:30 pm Pre-session motion picture

2:00 pm CONTINUOUS MINING

Chairman: John A. Stachura, general superintendent, Enoco Collieries, Inc., Vincennes, Ind. Continuous Mining in Medium Height Coal, Frank Williams, Jr., general manager, Pecks Run Coal Co., Buckhannon, W. Va. Discussion: J. C. Leighton, Carboloy Dept., General Electric Co., Detroit, Mich. Pillar Extraction With Continuous Mining in High Coal, Joe T. Taylor, mining engineer, Kaiser Steel Corp., Sunnyside, Utah. Power for Continuous Mining, J. O. Cree, electrical engineer, West Virginia Engineering Co., Charleston, W. Va.

1:30 pm Pre-session motion picture, Metallurgy Plus, Republic Steel Corp.

2:00 pm STRIP MINING

Chairman: T. G. Gerow, consultant, Chicago, Ill. Haulage Road for Strip Mining, R. I. Richardson, vice-president, Dakota Collieries Co., Beulah, N. Dakota. Recent Developments in Drilling and Blasting Overburden, Arnold E. Lamm, executive vice-president, Sunnyhill Coal Co., Columbus, Ohio. Discussion: George D. Grayer, sales engineer, Bucyrus Erie Co., Milwaukee, Wis. Maintenance of Strip Mining Equipment, William C. M. Butler, Jr., vice-president, Central Pennsylvania Quarry, Stripping and Construction Co., Hazleton, Pa.; Roy M. Leseney, general master mechanic, Truax-Traer Coal Co., Canton, Ill.

7:00 pm ANNUAL BANQUET

Presiding: G. A. Shoemaker, executive vice-president, Pittsburgh Consolidation Coal Co., and national chairman of program committee. Another "speechless" banquet, brief introductions of honored guests and a program of entertainment.



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for efficient, low-cost coal classification

1908 . . . the first Akins. Colorado Iron Works Company, established in 1860, specialized in making crushing, grinding, screening, cyanidation, amalgamation and smelting equipment. The Akins Classifier was developed by CIW to provide a practical, continuous system for separation of sand from slime.

The outstanding success of the Akins lead to many other successful applications and to Akins leadership in the field of classification. Today, every Akins installation on metallic, non-metallic and coal classification, sand washing, and heavy media is backed by 48 years of specialized classifier experience, 96 years experience in the mining machinery business.

1956...AKINS COAL CLASSIFIERS

Photograph shows part of a 66" Akins Simplex Double Pitch Coal Classifier. Six of these units have been in use for three years in one of the world's largest coal cleaning plants. Each of the 66" Akins is

raking 60 to 80 tons per hour of $-\frac{1}{4}$ " + 20 mesh product, overflowing 0 to 20 tons per hour of -20 mesh product. The extremely high capacity of these coal classification units is achieved through a unique modification of the Akins, developed from its application to heavy media separation.



1912 . . . A statement of policy . . . Then as now

"Our aim has always been the production of a highgrade line of machinery, the prices being made as low as consistent with high quality. In no case do we attempt to build a machine to come within a certain price and place it in the field of competition with others having low first cost as their chief merit. It is this policy, consistently maintained for fifty years, that has established our enviable reputation."

(taken from CIW catalog 10C published in 1912)

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COLORADO IRON WORKS Co.

DENVER, COLORADO

WRITE FOR CATALOG SPECIALISTS IN CLASSIFICATION FOR 48 YEARS

Foreign News (from p 118)

there was some doubt as to the published estimates of the extent and value of the deposits. Therefore a German expert, Dr. A. W. Taurer, was called into make a survey. His report set confirmed reserves at 270 million tons with "probable" re-serves of another 100 million tons, This should be sufficient to cover Argentina's total needs for at least a century to come.

Rio Turbio coal contains about 30% ash which could be reduced to about 13% by a washing process at the pit

head.

Argentina imported an average of 1,650,000 long tons a year in the period 1948-1954, with peaks of over two million tons in 1948 and 1951. In 1955, however, imports fell to a low of 1,205,000 tons.

WEST GERMANY

The government has begun paying part of miners' wages. The subsidy, according to the Ministry of Economic Affairs, is being paid in the form of untaxed bonuses to underground workers for each shift worked. To some miners the action represents an additional 10 to 12% of their earnings.

West Germany and Poland have reached an agreement in which the Germans will deliver 240,000 tons of rye to Poland in exchange for coal, steel and other goods. Most of the trading is to take place within twelve months.

GREAT BRITAIN

Britain's National Coal Board, faced with the refusal of the National Union of Mine Workers to accept Italian miners, is thinking up other ways of attracting manpower. Last year 5,200 men left the mines, creating one of Britain's biggest mining problems. Those who stayed on the job cost the coal industry 2,678,900 tons because of slow downs. The mine workers say that only better pay and conditions will attract more men. They have asked for a £1 (\$2.82) a week pay raise and shorter hours.

In an attempt to head off some "pie in the sky" thinking by the exponents of nuclear energy, Aubrey Jones, Britain's Minister of Fuel and Power, said it is wrong to believe that coal would not be needed in England in 20 yrs time. "In this country, there is a mistaken impression that although we are heavily dependent on coal, in 20 years' time we shall not need any more. That is entirely wrong. Mr. Jones said there is a need for a rising coal output and that a military disturbance in the Middle East could upset the country's oil supplies. He cautioned Britains that "it is wrong to talk of the death of the coal industry.

British mines produced 4,366,000 tons of anthracite in 1955, according to the Ministry of Fuel and Power. More than a fourth (1,687,000 tons) was exported. At the same time, according to the Ministry,

TOUGH HEAVY DUTY NG CABLES that have no equal!

New SUPERTUF JACKET* makes SUPER SERVICE MINING CABLES tougher than tough

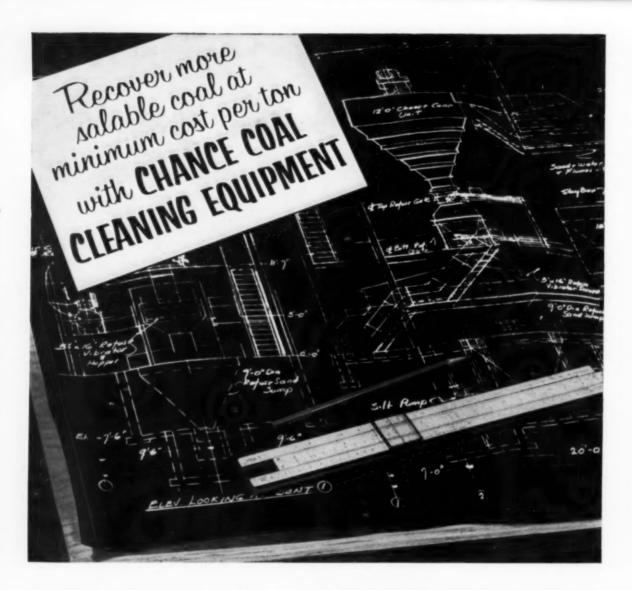
*General Cable's remarkable Flame Resistant SUPERTUF JACKET is a new neoprene compound processed for maximum lasting toughness, high density and tensile strength-extra smooth for wear, cut and tear resistance.

See it at Booth D-7 at the Bluefield Coal Show.



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A Chance Sand Flotation Process unit is the dependable, economical and lasting solution to your coal cleaning problems. Whether your operation is large or small, there is a Chance Cone to give you maximum efficiency at minimum cost.

Today, Chance Process units are cleaning in excess of 130,000,000 tons of coal annually, and our equipment is in use in all the major coal producing countries of the world.

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CHANCE CONES OFFER YOU

High Separating Efficiency

- ... Close to 100% recovery of salable coal
- . . . Washing gravity not affected by fluctuating rates of feed

Wide Flexibility

- ... Coal handled at gravities from 1.35 to 1.65 with sizes from 1/s in. to 10 in.
- . . . One man can change washing gravity in 5 minutes

Economy of Operation

- ... Heavy, well-built equipment assures trouble-free performance
- ... Equipment requires only part-time attention of one mon

UNITED ENGINEERS

& Constructors Inc

U.E.&C. (Canada) Ltd.

New York 17 • PHILADELPHIA 5 • Chicago 2

Foreign News (Continued)

the United Kingdom imported 11,346,-300 tons of coal. Much of it was bought from the United States (5,357,300 tons), France (2,727,800), Belgium (1,545,500) and Poland (1,357,700).

RUSSIA

The Soviet economic journal, Voprosy Ekonomiki, made large claims about the growth of productivity in the Soviet coal industry. It stated that as of August, 1955, under the jurisdiction of the Ministry of the Coal Industry of the USSR there were 1,240 coal-cutting combines of all types ("Donbass," "Gornyak," "UK T-1," "UKMG") and that Soviet coal mines operated about 3,000 loading machines of all types and about 100 drifting combines. The item clearly indicates that although the claims of mechanization of coal mining are often made in the Soviet press, the actual availability of equipment for mechanized coal-mining is pitifully small.

AUSTRIA

Austrian demand for coal is so pressing that trade quotas between Austria and the Soviet Union have been almost entirely used up. Because of this the USSR is expected to send 20,000 tons of blast furnace coke to Austria this summer. Meanwhile, the government is investigating the possibility of covering her foundry coke requirements with future purchases from the Soviet Union. Deliveries from West Germany and Poland, so far Austria's chief suppliers, are becoming inadequate. Last year Austria was forced to purchase large quantities from the United States, but Soviet coal has the advantage of being \$3 to \$4 cheaper.

CZECHOSLOVAKIA

The center of the Czechoslovak coal fields (Ostrawa) is facing serious operating difficulties. Extensive coal layers have been located, but a thick seam of stone and sand plus large fresh and salt water deposits separate the present shafts from the newly discovered layers. The subwater deposits are estimated to contain "many million metric tons of hard coal." Czech mining experts and hydrologists are trying to determine whether to pumpout the water, if that is possible without endangering the seams being worked, or to drill semi-vertical holes to reach under the stone and water layers.

KOREA

Government-owned coal mines, with the help of the United Nations Korean Reconstruction Agency (UNKRA), are staging a production comeback despite the destruction of the Korean war. The hostilities had virtually destroyed most mining machinery, equipment and supplies. The UN Agency, financed by the voluntary contributions of 36 governments, is currently spending \$8,500,000 on the coal industry. It has imported new The strongest rack bar makes the toughest jack



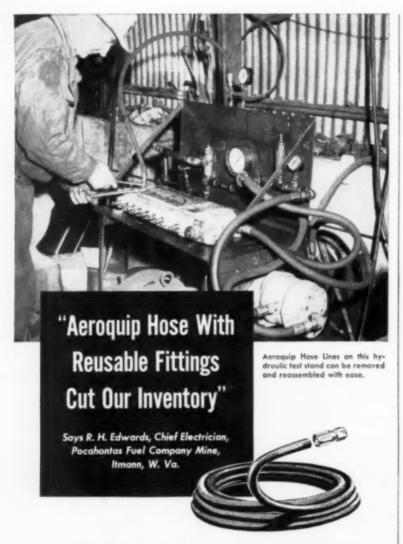
Long a favorite with coal miners is the 516 MT. It can raise 5 tons up to 9½ inches, is only 16 inches high when closed, has the famous oblong rack bar for greater strength and dependability. A ratchet jack like the Duff-Norton all-purpose 516 MT is no stronger than its rack bar, the notched steel "heart" that moves up and down holding the load. The forged steel rack bar on this 5-ton capacity coal mining jack is stronger and tougher than the rack bar on any other ratchet jack of this type. It's stronger because it's larger!

So get the most and best for your money with a Duff-Norton Jack.

Ask your distributor for information about Duff-Norton Jacks for coal mines. There's a jack for every lifting, pulling, and pushing job . . . or write the world's oldest and largest manufacturer of lifting jacks for your copy of "A Handy Guide for Selecting Duff-Norton Mine Jacks." Ask for bulletin Ad 10-J, Duff-Norton Company, P.O. Box 1889, Pittsburgh 30, Penna.

DUFF-NORTON Jacks

"Giving Industry A Lift Since 1883"



Hydraulic hose line replacements at Pocahontas' Itmann Mine are made quickly from a small supply of Aeroquip Bulk Hose and Reusable Fittings. Using Aeroquip, hose lines can be assembled as needed, in the maintenance shop or down in the mine.

"This cuts downtime and keeps equipment on the job," reports Mr. Edwards. "An Aeroquip installation is a lasting installation, too".

Your Yellow Page Telephone Directory lists the Aeroquip distributor near you. Call him, or write us for Bulletin 154.



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Foreign News (Continued)

compressors, drills, mine hoists, locomotives, coal cars and tons of steel rails that are being shaped to support mine roofs. Private mines are also coming under the program and tonnages in some of them have been doubled. Governmentowned workings are expected to produce 1,101,000 tons by mid-1956 and are scheduled to shoot for 2,640,000 tons by mid-1960.

JAPAN

The coal industry was brought to a complete stop last month by a strike of 160,000 miners who demanded a wage increase. Fifty-four mines were affected after wage negotiations between 13 coal companies and labor unions collapsed.

Preparation Facilities

Allison Engineering Co., Sligo, Pa.—Contract closed with Nelson L. Davis Co. for a "Neldco" Heavy Media Plant to wash plus ¾6 in coal at 100 tph. Plant utilizes feeders, conveyors, crushers, sizing screens and bins. Operating now.

Royalty Smokeless Coal Co., Clifftop, W. Va.—Contract closed with the Kanawha Mfg. Co. for a fine coal recovery system consisting of two stage 14-in and 3-in Heyl & Patterson cyclones, Einco 9 disc vacuum filter and conveying system. Capacity 17 tph recovered coal.

Slab Fork Coal Co., Slab Fork, W. Va.

-Contract closed with the Kanawha Mfg.
Co. for prepared coal dewatering and classifying system consisting of high speed shaker screens, coal transporting flumes, conveyors and washed coal crusher. Capacity 100 tph. Completion July, 1956.

Thomas W. Schneck, Pine Grove, Pa.—Contract closed with Deister Concentrator Co. for four SuperDuty Diagonal Deck No. 7 coal washing tables to clean rice anthracite, barley anthracite and No. 4 and No. 5 buck sizes.

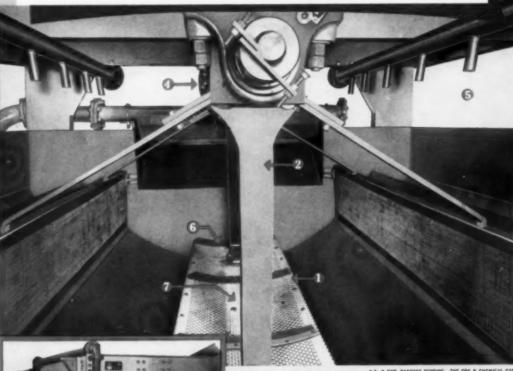
Alabama By-Products Corp., Maxine mine, Ala.—Contract closed with Deister Concentrator Co. for six SuperDuty Diagonal Deck No. 7 coal washing tables and one 6-way Split "Concenco" revolving feed distributor for feed distribution to the six coal cleaning tables.

George Fangmann, Jersey City, N. J.— Contract closed with Deister Concentrator Co. for one Leany Heavy Duty "No Blind" vibrating screen, double surface for screen at ½-in top surface and ¼-in lower surface.

Royalty Smokeless Coal Co., Richmond, Va.—Contract closed with Eimco Corp. for coal type vacuum filter and auxiliary equipment. 28x0 to the filter, 20 tph. Completion date July 7, 1956.

Alabama Power Co., Gorgas Mines, High Level, Ala.—Contract closed with Deister Machine Co. for four No. 16 Deister washing tables for ½ex0 coal to permit an additional 50 tph. Here's Design Simplicity You Can Cash in On

SEE HOW WILMOT-OCC HEAVY-MEDIA **VESSEL CUTS PRODUCTION COSTS**



- 1) Single rake performs dual functions: keeps medium in suspension, and gravity uniform; removes sink material.
- 2 Only one moving part in vessel.
- 3 No rotating parts in the medium.
- 4) No power-transmission trains; unique hydraulic motor is integral with drive shaft.
- 5 Open top and sides permit continuous visual inspection and easy accessibility.
- 6 Vessel readily cleared of sink material with a few extra strokes of blade, permitting quick start-up.
- 7 Only one point of friction in vessel: between rubbertipped rake and vessel bottom.

Commercial-Size Pilot Plant

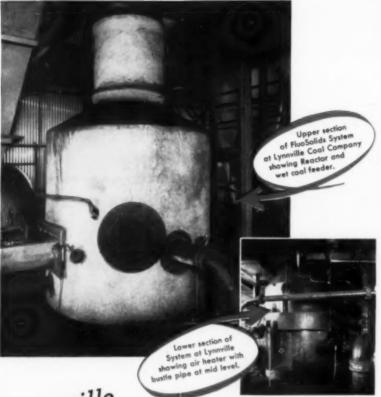
Test Gacilities Are Available



this design simplicity reduces all costs: capital, operating and maintenance. For example: WILMOT ENGINEERING CO. HAZLETON, PA.

The above interior picture of the Wilmot-OCC HM vessel graphically illustrates the un-

precedented simplicity it introduces. Check how



Coal Company
Coal Company
First to Dry Coal with
DORRCO FLUOSOLIDS*
SYSTEM

First successful application of fluid techniques to fine coal drying, a Dorrco FluoSolids System is now in operation at Lynnville Coal Company, Lynnville, Indiana. The System is currently drying 80 to 90 tons of metallurgical coal per hour . . . and installations are now being projected to dry 200 TPH and up in a single Reactor. Several months of operation at Lynnville have definitely proven the advantages of this new development over conventional dryers.

FIRST — The high drying efficiency inherent in a fluidized bed means instantaneous vaporization of surface moisture. Wet coal is fed to the fluid bed at an automatically controlled rate to maintain within close limits the preselected bed temperature.

SECOND — On a unit area basis, the FuoSolids System has an extremely high unit capacity. The entire drying system at Lynnville occupies only 1350 Square Feet.

THIRD — Close control and simple operation mean quick start up and shut down to meet varying requirements at the tipple . . . and the absence of moving parts in contact with hot gases holds maintenance to a minimum.

If you'd like more information on this radical departure from conventional fine coal dryers, write for a copy of Bulletin No. 7503. Dorr-Oliver Incorporated, Stamford, Connecticut.

503. Dorr-Oliver Incorporated, Stamford, Connect *FluoSolids T.M. Reg. U. S. Patent Office

WORLD-WIDE RESEARCH . ENGINEERING . EQUIPMENT

EQUIPMENT APPROVALS

Twelve approvals of permissible equipment were issued by the U. S. Bureau of Mines in February, as follows:

Joy Mfg. Co.—Type XB24/30-1E, 24-in portable extensible belt conveyor; three motors, each 15 hp, 250 v, DC. Approval 2-1123, Feb. 6.

Pittsburgh Coal Co.—Type PJ2 cable reel shuttle car; one motor, 26 hp, 550 v, DC. Approval 2-1124A, Feb. 6.

Joy Mfg. Co.—Type X-847-7 Model C, 30-in belt conveyer drive unit; one motor, 10 hp, 250 v, DC. Approval 2-1125, Feb. 8.

Joy Mfg. Co.—Types T25APE-1 and T25APF-1 mining machine trucks; two motors, each 4 hp, 250 or 500 v, DC. Approvals 2-1126/2-1126A, Feb. 10.

Joy Mfg. Co.—Types T285APE-I and T285APF-I mining machine trucks; two motors, each 4 hp, 250 or 500 v, DC. Approvals 2-1127/2-1127A, Feb. 14.

Joy Mfg. Co.—Type RBD11 roofdrilling machine; one motor, 26 hp, 220 or 440 v, AC. Approvals 2-1128/ 2-1128A, Feb. 24.

Gorman-Rupp Co.—Model 9264A pump; one motor, 5 hp, 250 v, DC. Approval 2-1129, Feb. 24.

Wilcox Mfg. Co.—Wilcox miner; three motors, one 50 hp, two 5 hp, 250 v, DC. Approval 2-1130, Feb. 27.

J. H. Fletcher & Co.—Type DJB7 roof-control drill; one motor, 20 hp. 230 v. DC. Approval 2-1131, Feb. 28.

Fairmont Machinery Co.—cable reel shuttle car; one motor, 25 hp, 250 v, DC. Approval 2-1132, Feb. 28.

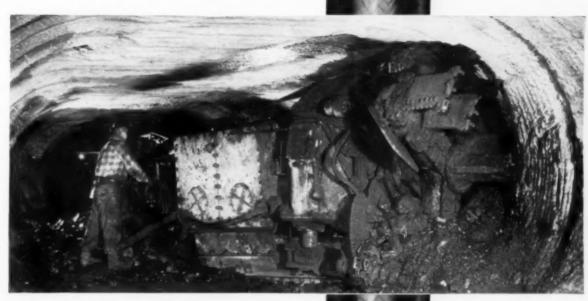
J. H. Fletcher & Co.—Type DJA7 roof drill; one motor, 20 hp, 230 v, DC. Approval 2-1133, Feb. 29.

Atlas Car & Mfg. Co.—Type B of M 157-222 single end control, storage battery locomotive; two motors, 96 v, DC. Approval 1546, Feb. 29.

In addition to permissible equipment approvals, the USBM issued two acceptance designations to cover certain belts that contain fire-resistant qualities as designated by Schedule 28.

Goodal Rubber Co.—"Mine King" fire-resistant belts: 4-ply, 32-oz and 5ply, 28-oz. Acceptance designation 28-8, Feb. 14.

Boston Woven Hose & Rubber Co.
—"Boston Flameout" fire-resistant
belts; 5-ply, 28-oz; 5-ply, 32-oz; and
4-ply, 42-oz. Acceptance designation
28-9, Feb. 14.



ROCKBESTOS

Goodman Boring Type Continuous Mining Machine

KEEPS MAINTENANCE DOWN ON THIS CONTINUOUS MINER THAT KEEPS TONNAGE UP

To get top performance with minimum down time leading mining machinery manufacturers specify and use Rockbestos A.V.C.

For example, take the continuous miner manufactured by Goodman Manufacturing Company, illustrated. This high ton-nage-producing machine cuts and loads up to 8 tons per minute.

With schedules geared to this kind of production - users can't afford wire failures. That's why Goodman uses Rockbestos A.V.C. for internal wiring in motors, in controllers and between controllers and resistors.

Goodman also uses Rockbestos in loaders, cutters, shuttle cars and locomotives.

You, too, can wire-in dependable performance by using Rockbestos A.V.C. High temperatures won't dry out or crack the insulation. And it won't bloom or rot when exposed to grease or oil. It fits bushings right, too.

When buying new equipment or rewiring old machines, specify and use Rockbestos A.V.C.

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Moore-Handley Hardware Co.
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Superior-Sterika VA.
Co.
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Westinghouse Electric Supply Co.
CLARKSEURG, W. VA.
Westinghouse Electric Supply Co.
COWEN, W. VA.
Pennsylvenia & W. Virginia Supply Corp.
ELM GROVE, W. VA.
Pennsylvania & W. Virginia Supply Corp.
EVANSVILLE, IND.
EVANSVILLE, IN

National Mine Service Co.
JENKINS, KY.
National Mine Service Co.
LOGAN, W. VA.
National Mine Service Co.
LOTHAIR, KY.

Mine Service Co.
McCLURE, VA.
Erwin Supply & Mardwere Co., Inc.
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Westinghouse Electric Supply Co.
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Kleenslot WEDGE WIRE PREPARATION SCREENS

Replace wire cloth in the elimination of blinding. Primary screening of raw 5 x 0 and 6 x 0 coal to remove the ½ x 0 for dry cleaning is no longer a problem at the four West Virginia plants of the Red Jacket Coal Corporation. Kleenslot Wedge Wire Screens have brought about this efficient change over. Since 1951 they have brought about continuous money saving in material and labor for replacements and have relieved plant operators of the need for frequent inspections to detect blinding and holes in the screen cloth.



It costs nothing to obtain a Wedge Wire recommendation. We will gladly furnish this service without obligation. Remember, Kleenslot Wedge Wire Screens are best by every test, so why not specify the best.

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Personal Notes



Mark E. Eastin



Hooper Love

Eastin Heads W. Kentucky As Hooper Love Resigns

Hooper Love, president of the West Kentucky Coal Co., Madisonville, Ky., since 1940, resigned March 16 because of illness. The company's board of directors, after accepting Mr. Love's resignation during a meeting in St. Petersburg, Fla., announced that it had elected Mark E. Eastin, Jr., to succeed Mr. Love. The board's chairman, Cleveland industrialist Cyrus S. Eaton, said Mr. Love's resignation had been accepted with regret.

Mr. Eastin, who is 51, was elected unanimously. He joined the company in 1929 after being graduated from Vanderbilt University. Before his election last month he served West Kentucky as an executive vice president. Mr. Love picked up the reins of West Kentucky presidency after the death of Charles F. Richardson. He has been associated with the coal company and its predecessor, the St. Bernard Coal Co., throughout his entire career of almost 50 yr. He has also been a director of the National Coal Association for several yr.

During Mr. Love's administration West Kentucky Coal increased the production of its mines from 1,620,046 tons in 1939 to more than 7,500,000 tons in 1956. Last fall West Kentucky acquired the Nashville Coal Co. (Coal Age, October, 1955, p 112) from Justin Potter. The combined companies are producing at a rate of more than 11 million tons a yr.

Obituaries

Martin L. Garvey, 74, a former president and general manager of several coal companies in West Virginia and Virginia, died March 22 in Georgetown University Hospital. A veteran coal man, Mr. Garvey had been an executive of the Pocahontas Fuel Co. for two decades. At 26 he was general superintendent of all Davis Coal & Coke Co. operations. In 1924 he headed the New River Coal Operators Association. He was well-known for efforts to deepen rivers for barge traffic.

James Capparell, president of the Capparell Stripping & Construction Co., Hazleton, Pa., died March 12. He was 84.

Albert S. Wilson, retired executive vice president of the Boone County Coal Corp., Philadelphia, Pa., and Sharples, W. Va., died Feb. 26 in Sarasota, Fla. He was 65. A coal executive for nearly 40 yrs, Mr. Wilson joined the Boone Co. in 1929 and retired in 1952. He was a

member of the board of directors of the Southern Coal Operators Association and the Kanawha Coal Operators Association.

Sen. Harley M. Kilgore (D-W. Va.) died February 28 in Washington, D. C. He was 63. The only West Virginia senator ever elected to a third term, Sen. Kilgore was chairman of the Senate Judiciary Committee and chairman of the Judiciary Antimonopoly Subcommittee. After funeral services in Beckley, W. Va., and Fort Meyer, Va., Mr. Kilgore was buried in Arlington National Cemetery.

George Stephens, 69, Grayson, Ky., died March 8 after a long illness. He was head of the Moore Branch Coal Co. and the Joyce Coal Co., which operate mines in Carter, Ky.

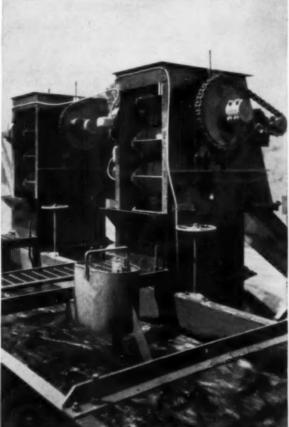
Bertram Chesleigh Hylton, retired general manager of the Lake Superior Coal Co., Superior, W. Va., and the Cannelton Coal & Coke Co., Cannelton, W. Va., died Feb. 17. He was 69. Mr. Hylton's

JIGGING stratifies materials according to specific gravity, separating solids in upward and downward pulsations of water. The heavier materials settle to the screen plate and are drawn off. The lighter materials overflow.

JIGGING is an almost universal separating process for materials ranging from the specific gravity of gold at 19 to coal at 1.3. Proportions of the high-gravity materials may vary from 90% to 10% or less.



a low-cost method of cleaning your coal...



Typical Jeffrey dense-medium jig in a coal preparation plant.

Jeffrey dense-medium plants are handling some of the world's toughest separation jobs, recovering coal of specified quality usually above 99.5%. A Jeffrey jig effectively separates coarse and fine sizes simultaneously, cleaning 8-inch to 100-mesh coal in the same jig. No necessity for prescreening jig feed.

The float-and-sink process employed by Jeffrey uses bone from raw coal itself as the medium, so there's no expense for that. The jig recovers the medium and maintains it at the proper density. No auxiliary equipment is required, except a conveyor to return the medium. Only enough water is needed to transport the coal, so fine coals are recovered better and a smaller, less costly settling system suffices.

For help in selecting a jig for your coal cleaning work, write the Materials Preparation Division, The Jeffrey Manufacturing Company, Columbus 16, Ohio.



CONVEYING . PROCESSING . MINING EQUIPMENT TRANSMISSION MACHINERY . CONTRACT MANUFACTURING



Obituaries (Continued)

retirement in June, 1955, ended a working span in coal that began before World War I when he joined the Tidewater Coal & Coke Co., Vivian, W. Va. In 1941 he was appointed superintendent, later became Lake Superior's general manager. He was named general manager of Cannelton in 1950.

Alexander Black Kiser, 83, a retired electrical engineer for the Pittsburgh Consolidation Coal Co., died Feb. 28 in Crafton, Pa. Mr. Kiser was employed by Pitt-Consol for 40 yrs. He had also been associated during the last 14 yrs with Heyl & Patterson, Inc.

Oscar P. Smith, 70, Taylorville, Ill., for 37 yrs an employee of the Peabody Coal Co., died Feb. 19 in Springfield, Ill. During his employment with Peabody Mr. Smith served as manager of No. 9 mine in Taylorville.

E. B. Dangerfield, a 76-year-old retired mine superintendent, died March 3 in DuQuoin, Ill. Mr. Dangerfield retired in 1951 as superintendent of the Peabody Coal Majestic No. 14 mine in DuQuoin after 50 yr in the mining industry.

MEETINGS

Canadian Institute of Mining and Metallurgy; annual meeting, April 9-11, Chateau Frontenec, Quebec City, Que.

Indiana Coal Mining Institute; spring meeting, April 14, American Legion home, Vincennes, Ind.

Bituminous Coal Research, Inc.; 3d Techno-Sales Conference and annual meeting, April 18-19, Deshler Hilton Hotel, Columbus, Ohio.

Colorado School of Mines; Symposium on Rock Mechanics, April 23-25, Golden, Colo.

American Mining Congress; Coal Convention, May 7-9, Hotel Netherland Plaza, Cincinnati, Ohio.

"Nucleonics" and Armour Research Foundation's Industrial Nuclear Technology Conference; May 15-16, Armour Research Foundation, Chicago, III.

Central Appalachian Section, AIME, spring meeting, May 19-20, Abingdon, Va.

Bluefield Coal Show, May 23-25, N&W Terminal, Bluefield, W. Va.

Open Pit Mining Association; 12th annual meeting, June 7, Bradley University, Peoria, III.

Rocky Mountain Coal Mining Institute; 52d regular meeting, June 17-20, Hotel Colorado, Glenwood Springs, Colo.

National Coal Association; Convention, June 13-14, Shoreham Hotel, Washington, D. C.



MARION POWER SHOVEL CO., MARION, OHIO



News Roundup (From p 116)

Co., an eastern Kentucky operator, established "several scholarships" at the University of Kentucky. Each was valued at \$700 to \$820. Consolidation said it would make \$3,000 to \$5,000 available for the school year 1956-57. Another company, the Pocahontas Fuel Co., Pocahontas, Va., established six engineering scholarships in three universities. West Virginia University, Virginia Polytechnic Institute and Lehigh University. The grants were for four years and were geared to cover tuition, certain university costs and part of living expenses. The third company was the Johnstown Coal & Coke Co., which operates in Pennsylvania and West Virginia. It offered two university scholarships in mining engineering valued at \$2,000 each. The company said it was making the offer to encourage younger employees and sons to fit themselves into positions of supervisory character. One scholarship winner, chosen from West Virginia employees, will attend West Virginia University; the other winner, chosen from Pennsylvania employees, will attend Pennsylvania University, Johnstown said.

Steel Diversion To Help Buildup Of Freight Cars

As coal production edged toward the 500 million-ton mark last fall and winter the nation's coal-carrying railroads hastily began ordering more and more new cars to replace those being scrapped and those needed to carry the increased load. Coal carriers, however, weren't the only roads needing new cars. Other railroads were feverishly ordering new cars, too. (e.g. 51,066 in November). By March they were awaiting delivery of 147,320.

But car-building shops were manufac-

Bituminous Output

PRODUCTION

YEAR TO DATE

March	10,	1956		100,	195,000
March	12,	1955		87,	042,000
	th :	earlier	% ahea		
WEEK	EN	DING	PR	ODU	CTION
March	10,	1956		9,	525,000
March	12,	1955		8,	404,000

Anthracite Output

YEAR TO DATE	PRODUCTION	
March 10, 1956	5,646,000	
March 12, 1955	5,516,000	
1956 output 2.4%	ahead of 1955	
A month earlier 0.5% under 1955.	1956 output was	
WEEK ENDING	PRODUCTION	
March 10, 1956	408,000	
March 12, 1955	442,000	

From Every Angle . . . HUBER-WARCO 5D-190 GRADER Scores on Haul Road Building and Maintenance



The Huber-Warco 5D-190 motor grader has proved to be a sensational performer on jobs that require top grader performance, such as the building and maintaining of important haul roads. Power for this 31,450 pound motor grader is supplied by a 195 h.p. GM-6-71 diesel engine. The power and weight are in perfect balance in order to give the highest working efficiency to the grader.

An Allison torque converter multiplies torque hydraulically and protects the unit from shock loads, thereby increasing the life of the engine and equipment.

A full power-shift transmission — WITHOUT CLUTCH—permits quick shifts under full load, without interrupting the power flow from the engine to the load. A tail shaft governor automatically adjusts engine RPM to meet any load condition, at any speed set by the operator.

Exclusive with Huber-Warco motor graders is the completely hydraulic cab-controlled blade movement which permits the blade to be moved from 90°

on one side to 90° on the other, without leaving the cab. The rotating saddle design eliminates linkages to adjust manually in bank-sloping operations.

A power sliding moldboard is standard equipment on the 5D-190—there's no deviation from the line of travel. Other important features include: full 360° blade rotation without removing scarifier teeth; four wheel brakes are standard; high front and rear axle clearance; wheels and tires are interchangeable.

These power and performance features have been combined to increase the working capacity of the 5D-190 and reduce costly down-time. With this motor grader it is possible to move more material with fewer passes. This increased working capacity will add more profit to every job.

Other Huber-Warco torque converter grader models include the 6-D and 7-D series. Models with standard transmission include the 4D-75, 4D-85 and 4D-115. For a demonstration—see your nearest Huber-Warco distributor.

For a demonstration — see your nearest Huber-Warco distributor



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MARION, OHIO, U. S. A.

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COLLYER INSULATED WIRE CO., 245 Roosevelt Avenue, Pawtucket, R. I.

News Roundup (Continued)

turing only 4,000 cars each month. Meanwhile, 6,000 were being scrapped during the same period. The only stopgap between an even greater scrap rate was a fast shop repair service.

Last month, as the shortage loomed as an ever-tightening situation (coal showed signs of doing even better this year, a big iron ore movement was scheduled and American business continued to boom), the first sign of major relief appeared. It came from Pittsburgh where the steel industry began shuffling its customer line-up, asking some steel users to wait or at least accept only part of their orders, while the already heavily-taxed mills attempted to build up the freight car fleet.

Priority meant a lot of steel would be diverted. One freight car requires 18 tons, most of it heavy plate. And although the railroads got 3,520,849 tons last year, nearly a million tons more than in 1954, the total number of cars owned by Class I railroads diminished from 1,735,553 in January, 1955 to 1,694,097 in January, 1956.

Some steel men want the special aid, or priority, for railroads to continue for months—perhaps through 1956. Both steel men and car builders believe the special aid will increase monthly freight car production to about 6,000, a number that will at least match the 6,000 cars being junked each month. To channel steel to the railroads one producer has already reduced the number of work turns in a pipe plant where heavy plate is used.

where heavy plate is used.

Once before (World War II) the steel industry and car builders had combined to combat a serious freight car shortage. A production record of little more than 10,000 cars a month had been set. Railroad men would not only like to see that figure reached again, but would also like to see it held there for a while. Coal carriers are hoping for something more—a diminished chorus of complaints by coal producers, who last year and this, blamed the car shortage for cut-backs in production and for idle workers.

News Briefs

Procedure governing the Bureau of Mines' participation in a \$17 million cooperative state and federal mine-drainage program for Pennsylvania's anthracite region was approved by Secretary of the Interior Douglas McKay. Mine-drainage construction contracts will be awarded by the state, which must submit project contracts to the USBM director before calling for bids. After a project has been evaluated, the director will recommend approval or disapproval. After approval the state may ask for bids. During the program the federal government will pay half the costs, Pennsylvania the other half.

Coal mine operators have until August 1 to protect mobile and portable equipment powered by trailing cables against the possibility of its frame becoming elec-

Champs with a new power punch!

These Task-Force heavyweights pack the biggest power punch in Chevrolet truck history with a completely new Loadmaster V8 and revolutionary new Powermatic Drive!

Modern short-stroke V8's are standard in all new Task-Force L.C.F.'s and heavyweight haulers—with the big new 322-cu.-in. Loadmaster in toptonnage L.C.F.'s and in other models rated up to 32,000 lbs. G.V.W. and 50,000 lbs. G.C.W.! It's Chevrolet's Taskmaster V8 in other heavy-duty models!

Get new Powermatic Drive, a 6-speed automatic specially built for heavy-duty jobs, for the most flexible and efficient application of engine power! Optional at extra cost in all conventional heavy- and most medium-duty trucks. See your Chevrolet dealer for details on the right model for your job! ... Chevrolet Division of General Motors, Detroit 2, Michigan.



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Anything less is an old-fashioned truck!

TWO TOOLS

that bring further automation to your coal production



erating efficiency and lower the costs of maintenance.

Simplicity Os-A-Veyor Feeders are self-cleaning units which experience none of the carryback or spillage found in other types of feeders. They are designed to decrease bridging and provide even feeding. The oscillating action is provided by two eccentric shafts coupled to a single V-belt drive, leaving only one assembly and four bearings te lubricate. Os-A-Veyor Feeders can be either main frame supported or bin-hung by springs and cables.



Simplicity Grizzly-Feeders can cut your coal handling cests 50% because they combine two operations in one machine. Old type feeder plus stationary grizzly are eliminated, thus saving you beth plant room and operating and maintenance expense. Available in sizes from 2' x 8' to 6' x 12', and in capacities up to 1000 tens per hour, the Simplicity Grizzly-Feeder has already improved production for many coal operators, and can do the same for yours. This is a rugged, simply-designed unit that will give you maximum output with very little maintenance.

Write us for full information on both the Simplicity Os-A-Veyor Feeder and the Grizzly-Feeder.

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News Briefs (Continued)

trified. After that date they can be cited for violating the Federal Mine Safety Code or the Federal Coal Mine Safety Act, whichever is applicable. The United States Bureau of Mines suspended code and permissibility requirements Nov. 30, 1953, after protests that frame-grounding imposed an unreasonable burden on operators. Since then at least one protective device has turned up which can be mounted on or built into coal-mine equipment. Consisting of a series of relays, the device will cut off current the moment an insulation failure or other fault charges the frame. The USBM has certified the device as explosion-proof.

The Morrisdale (Pa.) Coal Mining Co. acquired the Clearfield Bituminous Coal Corp.'s Clymer, Pa., No. 2 mine April 1. The mine will continue as Clymer No. 2, operating in the lower Kittanning seam. Its surface preparation plant is equipped with heavy media washing and air table cleaning facilities. The new owners expect to institute a program of improvements and modernization to increase capacity.

Fire destroyed a coal breaker owned by the Moosic Mountain Coal Co., Olyphant, Pa., idling 15 employes. Damago was estimated at \$175,000. The breaker was capable of handling 800 tpd.

The mounting costs of railroad freight rates may be countered with pipeline and barge transportation, the nation's leading coal producer believes. Pittsburgh Consolidation, in its annual report, hints that the 110-mile pipeline it is building from Ohio to Lake Erie may be the forerunner of bigger, longer and higher-

1955 Coal Earnings

The earnings reported below are for the year ending Dec. 31, 1955, compared with the same period of 1954.

Pittsburgh Consolidation Coal Co.—1955 net income of \$14,156,000, or \$6.55 a share, compared with 1954 earnings of \$11,108,000, or \$5.15 a share. Total earnings, revenue, \$170,466,361 for 1955 against \$151,155,911 for 1954 (exclusive of profits or disposal of properties and investments of \$994,090 in 1954 and loss of \$190,182 in 1955).

Lehigh Valley Coal Corp.—1955 net profit of \$339,951 on sales of \$17,578,799 compared with a net loss of \$730,971 on sales of \$16,901,495 in 1954.

Glen Alden Corp.—1955 net income of \$154,249, or \$0.08 a share, compared with \$181,843, or \$0.11 a share in 1954. 1955 sales totaled \$58.7 million, compared with \$73.5 million in 1954.

Island Creek Coal Co.—1955 net income of \$6,161,076, or \$1.53 a share, compared with 1954 earnings of \$2,867,-374, or \$1.16 a share. Total income in 1955, \$79,869,088 against \$56,843,110 in 1954.



1 This 2½-yd. capacity Michigan Tractor Shovel with scarifier attachment is used to rip out bone at a West Virginia mine. The scarifier teeth bite into the slate as the operator drags the bucket backwards; down pressure is applied when needed by two powerful hydraulic boom cylinders.



3 The scarifier teeth retract automatically as the Michigan starts its forward pass. Stripping this tough material requires maximum torque and tractive effort. The Clark torque converter automatically matches the increased torque requirement as it multiplies engine torque up to 300%. The power-flow is so smooth that there's practically no wheel slippage.



5 On its primary job at the tipple, the Michigan works within a radius of 300-yds., blends various grades of coal and loads trucks. The scarifier does not interfere with normal bucket work. The Michigan averages 1200 tons in a normal 7½ hour period with the standard 2¼-yd. bucket. Power-shifting saves time on every cycle between pile and truck.

Rips out bone seam with scarifier on big Michigan Tractor Shovel



2 At the end of the reverse pass, the Michigan has ripped a path of slate 20-feet long by 8-feet wide. The bone runs from 1-inch to 18-inches thick. This scarifying job was formerly handled by road graders, but a loader or crawler-type dozer was still required to dispose of the waste material. Now the Michigan handles the entire job by itself.



4 Powerful low-level bucket action comes into play. Two big double-acting bucket cylinders exert tremendous break-out action, enable the operator to work the cutting-edge up and down to rip out big slabs of slate. Crawlers churned the bone into the coal and created loss; the big rubber tires eliminate this loss and track wear.

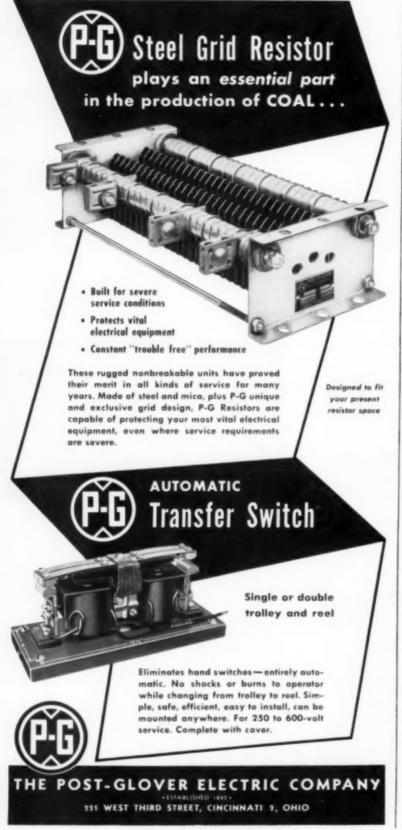
In this operation, the Michigan Model 175A delivers a substantial saving by eliminating a grader, a crawler-dozer and in some instances, a truck. This saving is in addition to the primary job at the washing plant.

Many other Michigan owners are finding that this Tractor Shovel will actually improve production on jobs which have never even been tried on rubber. The complete power-train — torque converter, power-shift transmission, planetary axles — was designed and built entirely by Clark, specifically engineered to give this machine more useable power and traction than you've ever seen on a rubber-tired tractor shovel. For proof, ask your Michigan distributor to demonstrate. You name the job!



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CLARK EQUIPMENT COMPANY
Construction Machinery Division
2473 Pipestone Road
Benton Harbor 8, Michigan



News Briefs (Continued)

tonnage lines running from the fields of West Virginia and Pennsylvania to the east coast. George H. Love, president of the company, said that both oil and gas, moving through pipelines and in tankers, have a much lower transportation cost than coal. Atomic energy, he said, is freightless. He noted that many coal purchasers are taking advantage of cheaper water transportation and that coal from mines not situated directly on a river moves by barge in many cases.

Stonega Coke & Coal Co. announced proudly last month that all its employes at Imboden Colliery, Imboden, Va., and all its employes at Osaka mine, Va., had completed the U. S. Bureau of Mines accident prevention course for miners and had been awarded certificates. After receiving their USBM certification, the colliery and the local union were awarded certificates by the United Mine Workers of America and its president, John L. Lewis. The presentations were made in Exeter and Stonega, Va., March 3.

The Mile Branch Coal Co., Pittsburgh, Pa., has filed a \$5.4 million damage suit against the United Mine Workers of America in Federal District Court, Washington, D. C. The suit asks \$2.7 million damages for an "illegal strike" and an additional \$2.7 million for punitive and exemplary damages. The coal company charges that its employes, members of the UMWA, struck June 9, 1953, without instification.

The North American Coal Corp., Cleveland, Ohio, bought the Seward mine, Johnstown, Pa., from the Pennsylvania Electric Co., Johnstown. H. G. Schmidt, North American president, said the mine would supply some 800,000 tons a year and will be operated by a newly formed subsidiary, Conemaugh Mining Co.

West Kentucky Coal Co. has completed plans for construction of a \$1 million loading and transfer dock at Port Tampa, Fla. The company's directors have also authorized the purchase of \$5,000,000 worth of boats and barges. West Kentucky will transport 1,000,000 tons of coal a year to Tampa Electric Co., the first Florida power company to break away from oil in favor of large amounts of coal. The action is a result of West Kentucky's campaign to woo Florida power producers away from oil.

In Central City, Ky., the Gibraltar Coal Co., which plans to begin operating a 12,000-tpd strip mine this month, has excavated a 1,300-ft long canal from the Green River to a point near the tipple of the new mine. A conveyor belt, will move coal from the tipple to piers in the canal, where the coal will be dropped into barges.

Bishop Canyon Uranium Corp. (Colorado) has blocked out a 3,000,000 ton coal deposit on its 3,500-acre lease west

(Continued on p 144)

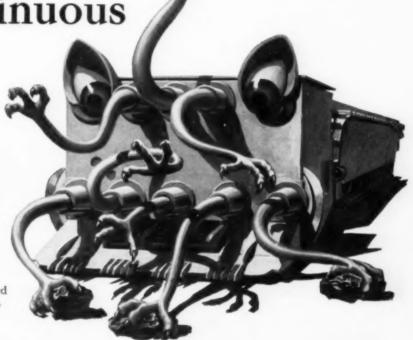
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Continuous miners claw through a seam with amazing speed. That is, until there's a cable failure. Then you have a continuous loafer—an expensive piece of equipment to have lying around doing nothing. Get that loafer going again by introducing him to Hazacord, then they'll both be "going steady."

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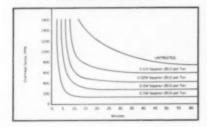


COAL FINES SETTLE 17 TIMES FASTER WITH ADDITION OF SEPARAN 2610

. New flocculating agent breaking bottlenecks in nearly every use

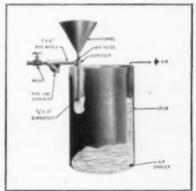
A coal thickener in a West Virginia plant was overloaded. It took over 2 hours to clear to the desired 300 ppm overhead solids. Separan* 2610 was added at the rate of 0.05 lb. per ton of fines. Clarification time was cut from 2 hours to 7 minutes! 17 times faster! Besides cleaning up overheads and avoiding stream pollution, you can em-

COAL FINES-SETTLING RATE



ploy closed circuits and conserve water with this new flocculating agent. You can cut down recycle solids and reduce maintenance. You can recover more fines by improving filter rate. And, very important, you can increase plant capacity by getting more throughput on present equipment.

Separan 2610 is different. It's a synthetic, organic polymer that is effective in both acid and alkaline media. It's highly economical. It requires no preservative. But that's not all! It's noncorrosive and presents no health hazard in normal handling and use. And it's easy to prepare and apply. Interest aroused? Write for particulars and a sample to the Dow Chemical Company, Dept. TS 930E-1, Midland, Michigan.



New disperser has been developed by Dow to permit dissolving of large amounts of Separan 2610 without use of a mechanical mixer. This solution needs no preservative in normal storage or use.

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THERE ARE many brands of plastic pipe ... some good, some not. They all look alike ... except CARLON^o, the best of 'em all. It's THE PIPE WITH THE STRIPE ... guaranteed for life against rot, rust and electrolytic corrosion! Price is competitive, too.

Whether you use Carlon plastic pipe to carry off corrosive mine waters, or to convey water wherever you want it ... above ground or below ... it will never fail you as metal or inferior plastic pipe may. So LOOK FOR THE STRIPE!

Carlon plastic pipe not only performs better and lasts lots longer . . . it's far less expensive, too. Less in first cost, less in handling cost, less in installation cost . . . and, of course, much less in lifetime cost!

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WORLD'S LARGEST MANUFACTURER OF PLASTIC PIPE

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We are interested in Carlon plastic pi coal mines. Please send more inform	
tour mines a rease sense more miner	
NameCompany	

News Briefs (Continued)

of Durango, Colo. Development of the coal deposit probably will depend on location of an expected \$10 million power plant to serve the San Juan Basin area.

A proposed law that would have permitted Kentucky coal operators to establish conveyor lines for moving coal to rail heads was passed by the Kentucky legislature but vetoed by Gov. A. B. Chandler. Gov. Chandler vetoed the bill because it would give conveyor companies the right to condemn land for routes through privately-owned properties. He held that it would increase condemnation powers of corporations and that this was not in the public interest.

A series of bills that would liberalize Virginia's truck size and weight limit laws and at the same time boost truck levies by nearly \$3,000,000, has passed the Virginia legislature and was awaiting the signature of Gov. Thomas B. Stanley (Dem.). If passed the legislation would increase gross weight limits from 50,000 lb on major highways to 56,800 lb on all highways. Another provision would raise truck lengths from 45 ft to a maximum of 50. The increased revenue would come by hiking the state road tax from 6c to 8c a gallon on trucks with more than two axles, Another section of the legislation would shift the heaviest part of truck license fees to vehicles of more than 18,000 tons.

A Federal District Court judge in Chicago has approved an out-of-court agreement of two suits brought against the consolidation of the Peabody and Sinclair coal companies. The suits were brought last summer by minority shareholder groups. The out-of-court agreement provides pre-merger Peabody stockholders with an opportunity to buy extra Peabody

shares at a rate under the current market value.

Philadelphia & Reading Corp. moved toward its second major diversification acquisition with the announcement that it will acquire the Acme Boot Mfg. Co., Clarksville, Tenn. Last year the company bought the Union Underwear Co. Howard A. Newman, president of P&R, disclosed no details but said the newest acquisition would bring P&R "substantial earnings." Acme produces cowboy boots and several other boot lines. Its plants are in Clarksville, Cookeville and Ashland City, Tenn.

Ayrshire Collieries Corp., Indianapolis, Ind., purchased the Carmac Coal Co. March 1 and will operate Carmac as a wholly-owned mining subsidiary. At the same time it announced the purchase Ayrshire also said that its new subsidiary had acquired the Delta mine, a strip operation in the Illinois No. 6 seam near Marion, Ill., from Delta Collieries Corp. Carmac already mines coal near Marion. Its Carmac mine operates in the Illinois No. 5 seam.

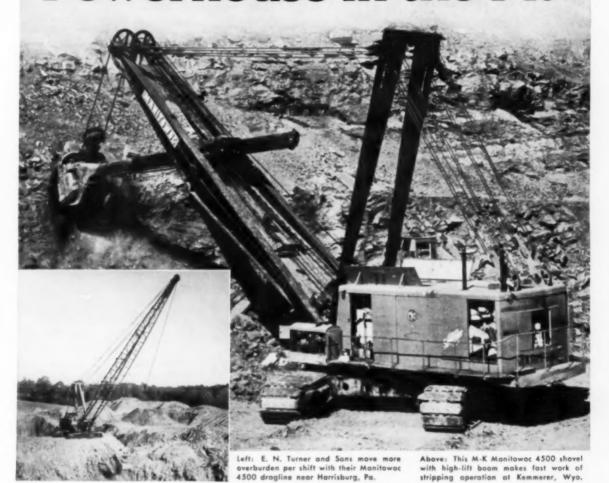
Interior Dept. officials were reported considering Edward G. Fox, president of the Reading Anthracite Corp., Pottsville, Pa., for the directorship of the Bureau of Mines. Unnamed sources, reportedly in a position to know, said in Washington, D. C., that the appointment of Mr. Fox has the approval of Secretary Douglas McKay. The plan would make Mr. Fox USBM director and Marlin J. Ankeny head of an enlarged USBM health and safety program. Mr. Ankeny is safety director of the Bituminous Coal Operators Assn. The USBM directorship has been vacant since the retirement of John J. Forbes last November. Thomas H. Miller, deputy director under Mr. Forbes, is acting director. Mr. Fox, in his home at Pottsville, said when the report reached



COAL MEN ON THE JOB . . .

AMHERST COAL CO.—Dana slope, Rensford, W. Va. Seated: Troy Atkins (left), chief electrician; Charles Hicks, Virgil Travis and Hirm Queens, section foremen. Standing: Grant Cantley (left), section foreman; Howard Epperly, day mine foreman; Nimmey Maloney, night mine foreman; Harold Moore, Robert Stone, Henry Hudnel and John Gunning, section foremen; and Paul Riddle, track foreman.

Powerhouse in the Pit!



TORQUE CONVERTER FEATURES

- PRECISE CONTROL by either hand throttle or foot accelerator without slipping clutches or shifting speeds.
- BALANCED POWER LOAD for economy of operation load requirements and engine horsepower automatically balanced.
- UNLIMITED SPEEDS without shifting since speeds and power are equal at all times.



Manitowoc 4500 Loads Out Greater Tonnage for Peak Production

Manitowoc 4500 shovels and draglines are boosting stripping and loading records in every mining area of the country. These powerful 4-5½ yd. excavators boost output substantially for profit-conscious operators who require the 4500's power and stamina.

High on the list of preferred features is the 4500's ability to take rock digging shock, shift after shift, with little downtime. The extra-strength, high tensile steel shovel boom has heavy, "bridge-built" side beams; tubular dipper stick turns in the saddle to absorb all digging stress and strain; positive-action torque converter matches engine power to the load; special 60' high-lift booms extend shovel digging and dumping ranges. Gas or diesel drive with simple gear arrangement eliminates thousands of wires and connections necessary in electrically powered machines. There's no need for cumbersome trailing cable; power loss through prime mover and D.C. generator is eliminated; entire shovel can be disassembled, moved and set up in several days instead of weeks.

Look into *all* of the 4500's outstanding advantages before investing in your next shovel or dragline. See why the speed, mobility, simplified design and versatility of these mighty mining machines are making news wherever they're in use. MANITOWOC ENGINEERING CORP., MANITOWOC, WIS.





Raise or lower notch-by-notch for greatest safety. Three sizes for all types of seams. Also ideal for lifting or skidding mine machinery, re-railing mine locomotives. Capacity 5 tons. Double-lever sockets permit lifting in close quarters.

Here's the jack that does a variety of jobs. It lifts 15 tons on the cap, on the toe, on the capshoe or at intermediate heights with a chain sling. The base tilts, allowing it to lift, push or pull at any angle.



TEMPLETON, KENLY & CO. 2501 Gardner Road Broadview, Illinois

Write for Details in General Catalog No. 53 and Mines 47.

News Briefs (Continued)

him: "I am not a candidate for the position." He admitted he had been approached and urged to take the job.

A week-long Conference on Coal has been scheduled by the Gordon Research Conferences of the American Association for the Advancement of Science. It will be held at New Hampton School, New Hampton, N. H., July 2-6. Among the topics to be discussed are: Absorption spectra of coal and its degradation products; structural significance of the physical properties of coal; sorption of gases and liquids by coal; organic chemical approaches to the structure of coal; chemistry of low temperature tar from lignite; and microbiological studies of coal. For information: Dr. George Parks, director, University of Rhode Island, Kingston, I. H. H. Storch is chairman, John Mitchell is vice-chairman.

The Moffat coal mine, Sparta, Ill., closed Feb. 28 after 53 yr of operation. During the span the mine gave up 18 million tons of coal. The closing, which left only two mines operating in the Sparta district, forced 180 miners out of their jobs. Operating machinery is being pulled from the mine, but the company, Zeigler Coal & Coke, will leave a preparation plant standing. Last year Moffat produced 293,657 tons.

More than 300 men were idled when noxious gases seeped into the Baltimore Colliery of the Hudson Coal Co, in Luzerne County, Pa. G. B. Filmore, president of the company, said that the gas came from a nearby abandoned mine that has been burning for a number of years.

Four men have been appointed to the staff of Bituminous Coal Research, Inc. Three of them were assigned to the Columbus, Ohio, laboratory of BCR as project engineers, the fourth to head-quarters in Pittsburgh, Pa., an an editor. The three engineers are Robert J. Grace, who left a job as assistant professor of fuel technology at Pennsylvania State University; Franklin D. Cooper, a former technical advisor and research chemist; and Robert D. Harris, a laboratory and staff engineer. The editor is James W. Jacoby, former Public Information staffer, Pennsylvania State University.

In 1954 a fire destroyed a coal tipple owned by the R. T. Davis Coal Co., Breathitt County, Ky. As a result nine insurance companies paid the owners \$19,500, then went to court and charged that the fire had been caused by sparks from a Louisville & Nashville Railroad locomotive, Last month in Kentucky's Circuit Court, Judge Ray F. Bossmeyer said that the insurance companies had failed to show negligence and ruled in favor of the railroad company.

Excavation work on Appalachian Electric Power's \$55,000,000 steam electric generating plant is scheduled to begin next month on a 105-acre site near Carbo, (Continued p 150)



"Easy as filling a coffee bag," say men who prepare supply of Akremite.



Simple and safe to store, Akremite can be mixed right at the mine location.

"How We Cut Blasting Costs 50%, Increased Output 20%, with New Akremite Process"

Spencer prilled Ammonium Nitrate is base for new simple, safe, low-cost explosive

"We've found the new Akremite Blasting Process, now in use at our Cheshire, Ohio, operations, to be the ideal explosive for strip mining," reports F. H. Howe, Superintendent of Ohio River Collieries. "Because the ingredients are cheaper and the mixing process so much simpler, we have cut explosive costs 50% with Akremite. At the same time, better fragmentation produced by Akremite lets us move 20% more yards per month.

"The terrain in which we work is unusually difficult, but because Akremite is so safe and easy to handle, we still come out ahead."

Akremite, the simple but revolu-

tionary new explosive, is named after its inventor, R. I. Akre, superintendent of drilling at Maumee Collieries Co., Terre Haute, Ind. Akre uses prilled Ammonium Nitrate, produced by Spencer Chemical Company, as the base for his new explosive.

By itself, ammonium nitrate is not an explosive. But Akre found that if he mixed it with carbon black, packed it in a polyethylene bag, confined it in a drill hole and detonated it with a high gelatin dynamite and primacord, it produced a tremendous explosion.

Recently, Southern Research Institute at Birmingham put Akre-

mite through a series of safety tests. They fired bullets into bags of freshly made Akremite. And they conducted the regular pendulum-friction and modified propagation-through-air tests.

Not a single explosion, fire or crackling resulted from any of these tests. Akremite with Spencer prilled Ammonium Nitrate is not only cheaper and better, but many mines report it is the safest strip mine explosive they have ever used.

(NOTE: Spencer Chemical Co. will be happy to provide you with further information about the Akremite Method as discussed by Mr. Howe.)

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EXTRA-TOUGH going calls for extra-tough AMSCO® DIPPERS...with Renewable Lip

On the Iron Range and in the Copper Mines, demands on dippers are really tough. And that's where Amsco Manganese Steel Dippers have proved they can "take it"...in years of rough use.

Amsco Renewable Lip Dippers are particular favorites here. For when the lip eventually wears out, this easily changed unit cuts "repair-time" to one-tenth that required for changeover of conventional designs.

The lip sides overlap and fit snugly into sockets in the back casting. Lugs on lip fit into slots in front casting and are secured by forged, split keys. Sturdy U-bolts fasten lip to back casting, pulling it tightly to dipper when double nuts are screwed down. The result is one-piece rigidity and strength, free of play in any direction.

You save two ways: first, through the extra-long service life of Amsco Manganese Steel Dippers; second, through quick and easy replacement of the Renewable Lip.

See your shovel manufacturer for full information on Amsco Dippers, or write us direct.



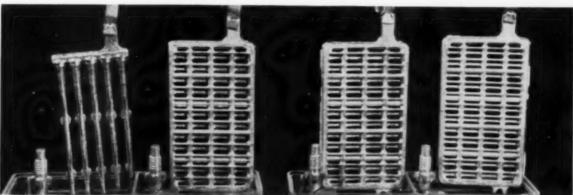


AMSCO

American Manganese Steel Division - Chicago Heights, III.
OTHER PLANTS IN: DENVER, LOS ANGELES, NEW CASTLE, DELAWARE, OAKLAND, ST. LOUIS; JOLIETTE, QUEBEC

EXIDE-IRONCLAD BATTERIES

For all mining applications



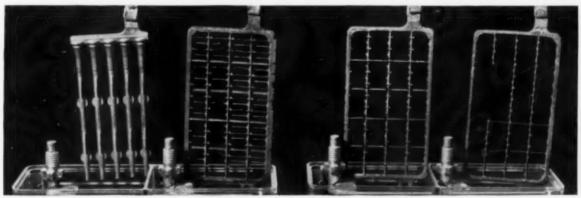
BEFORE:

Silvium alloy

Alloy "A"

Allov "R

Alloy "C"



AFTER: Note how the Silvium grid resisted corrosion. Compare it with the other alloys.

Corrosion resistant SILVIUM prolongs battery life



BATTERY FOR MINING LOCOMOTIVE, Model MVM. Specially designed to fit space provided on locomotive. Has tubular construction of positive plates, Silvium grids, "Permanized" negative plates, extra heavy connectors, and all other Exide-Ironclad advantages that mean power to spare in heavy duty applications. Write for Bulletin 5161.



Reaching down deep into every Exide-Ironclad Battery are the fingers of Silvium alloy metal which form the grids of the famous Exide-Ironclad positive plates.

Silvium is a special alloy developed by Exide to resist corrosion and thus prolong battery life. For proof, Exide research engineers compared the performance of an Ironclad Silvium grid side by side with ordinary grids of other lead alloys. As the photographs above show, only Silvium came through the test without damaging corrosion—undiminished in size, unimpaired in strength. The other grids showed from moderate to severe corrosion.

Tests have proved that Silvium is not only more resistant to corrosion, but also a better conductor of electricity. Hence it both prolongs battery life and —because there's less internal battery resistance—more readily permits heavy drafts of power.

This special material is only one of the many exclusive features which have made Exide-Ironclad Batteries world famous for high capacity and long life. When you order batteries for heavy duty applications, or the equipment requiring such batteries, be sure to specify Exide-Ironclad. Write for detailed bulletin. Exide Industrial Division, The Electric Storage Battery Company, Phila. 2, Pa.





GUYAN Sealed Beam HEADLIGHTS for MINE EQUIPMENT

Guyan Sealed Beam Headlights are made in three sizes. The voltage rating is 6, 32 and 115 volts. To operate from 250 or 500 volt trolley voltage, we can furnish a resistor to lower voltage to required lamp voltage.

Type 7 IN is a utility headlight using standard automobile lamp, two filaments, to project the beam either close or far.

Type ML for main line locomotives has a narrow powerful beam (70,000 beam C.P.). Furnished also for 32 and 115 volts.

Type 4 IN is recommended for gathering locomotives, shuttle cars and loading machines.

Write for Bulletin

GUYAN

MACHINERY CO.

LOGAN . . . West Virginia

News Briefs (Continued)

Va. Appalachian Electric plans to construct two 22,500 kw generating units, with No. 1 unit scheduled to be operating early in 1958. The station will be known as the Clinch River plant and is expected to consume about 1,300,000 tons of coal a year. The Clinchfield Coal Corp. whose coal fields are situated close by, has agreed to set aside 40,000,000 tons from its reserves. Appalachian is an operating subsidiary of American Gas & Electric Co. The two generating units are the sixth and seventh additions of similar size to the AGE system. They will raise total generating capability 325% more than capability at the end of World War II, according to Philip Sporn, president.

The Saskatchewan Power Corp. is expected to start construction in 1956 on the first, \$14 million part of a \$40 million coal-fueled steam electric generating plant near Estevan, Saskatchewan, within 10 mi of the U. S. border. The plant's ultimate capacity, 264,000 kw, will be generated by four 66,000 kw turbogenerators. Huge lignite deposits in the vicinity will fuel the plant. The reason to by-pass proven reserves of hydro, oil and natural gas in favor of the lignite was given in a report by the Saskatchewan government. Reserves of low-grade coal will last for hundreds of years. But nat-

ural gas and oil were expected to be exhausted by 1974 and 1971.

Legislation to regulate strikes and picketing has been introduced in the Kentucky Legislature. The legislation would make it unlawful for strikers to interfere with any person's "exercise of his employment, vocation or business activity." Courts would be permitted to end picketing in cases of violence and ban circulation of false or libelous statements by strikers. The bill would also make it unlawful for pickets to station themselves anywhere except the place where a dispute was in progress. Pickets not employed by the struck firm would also be banned. Violators would be fined a maximum of \$5,000 and a jail term up to 6 mo. Sentences from 1 to 5 yr could be ordered for property damage and 15 yr jail terms for death or personal injury.

The Lehigh Valley Coal Corp. has announced it plans to diversify and expand during 1956, according to H. W. Bradbury, executive vice president. The corporation did not say which fields of business it intended to investigate but said it has been considering a "number of proposals." Money for the diversification program reportedly will be supplied by the Lehigh Valley Coal Sales Co. and other subsidiaries, which are said to have more than \$5,000,000 on hand for the purpose.

Neff & Fry Silos used as stacks

You think of silos as bins or tanks for the storage of coal and other flowable bulk materials. But many of them serve as exhaust or smoke stacks.

An instance of a Nett & Fry silo used as a smoke stack was mentioned in the December COAL AGE article titled. "The Ceredo Improvement Story."

There are several good reasons for building stacks of Neff & Fry Super-Concrete Staves. One is, generally, lower cost. Another is wind resistance because tall Neff & Fry stacks are anchored to the foundation. You see three of the anchor straphalfway up the stack in the photograph. Neff & Fry stacks need no guy wires. They don't rust. Nor do they require painting.

Netf & Fry stacks are used principally for ventilating mines and for exhausting fumes from coal dryers.

You are invited to ask us for more information on this subject.

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With the handy portable HYDRA-GRIP and a few ARMSTRONG-BRAY Pullers, you can quickly, safely and easily remove gears, wheels, bearings, sheaves or parts from shafts, can re-install them with equal case. Single centered ram assures aligned thrust that moves parts along shafts amoothly without wedging or binding. Saves time, saves parts—ends battering and breakage. The HYDRAGRIP—comes complete with handy, portable, hydraulic hand pump, high

with handy, portable, hydraulic hand pump, high pressure connecting hose and 17½-ton capacity hydraulic jack with interchangeable heads.

Write for Catalog Sheet—describes HYDRAGRIP and complete line of standard and special external and internal pullers.

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"Now we wash lumps not fines it's a lot cheaper and quicker"



NON-EXPLOSIVE MINING METHOD Cuts Costs 5 Ways

- · Produces less fines in face preparation
- Rolls coal forward for faster, easier loading
- · Easier on "tender" roofs—cuts timbering, bolting
- · Lowers cleaning costs by minimizing
- Reduces degradation—no shattered coal

The reason is simple—Airdox! The slow heaving action of Airdox gently dislodges coal from the working face, producing coarse coal rather than fines. When the coal reaches the cleaning plant, no bottleneck is created because coarse coal is much easier and quicker to wash than fines. This time-saving operation reduces cleaning costs and increases cleaning plant capacity. These advantages plus faster loading and less wear and maintenance on mechanical equipment, make Airdox the most economical method known for face preparation.

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The MERRICK WEIGHTOMETER gives the answer. While material is smoothly moving along a conveyor, the MERRICK WEIGHT-OMETER not only keeps a continuous and accurate record of weights but total weight is available at a glance.

Applied to any size belt conveyor, either horizontal or inclined. The Weightometer gives a simplified and dependable record of your production, without interrupting flow of coal.

Write for Bulletin 851

MERRICK SCALE MFG. CO.

Engineers and Mfrs. of Automatic Weighing Equipment PASSAIC, N. J.

Among the Manufacturers

Square D Co. will spend \$9 million in the next 22 months on new plants and capital improvements. The amount equals Square D's total new plant investment during the last 10 yr. The expansion will give the company an additional 400,000 sq ft for production, including a \$3 million Milwaukee plant. The locations of additional plants have not been disclosed so far.

Construction of a 50,000 sq ft addition will get under way soon at the Durand, Mich., plant of Simplicity Engineering Co. The screen feeder and conveyor manufacturing company expects the building to be completed this summer. Simplicity hasn't said how much the addition will cost.

Brunner & Lay, Inc., Franklin Park, Ill., is spending \$1 million for a new plant location (undisclosed), a new plant at an existing location and building additions at present locations.

Atlas Powder Co. will award eight \$1,000 college scholarships again this year to chemistry and engineering students who will be seniors during 1956-57. This is the third year in which Atlas has made the awards. Scholastic records and faculty recommendations count most. The

company says it has invited 38 colleges and universities to participate.

The 78-yr old Okonite Co., Passaic, N. J., bought the 160-acre Studebaker-Packard plant in New Brunswick, N. J. Okonite bought the property from Volkswagen of America, Inc., a subsidiary of Volkswagenwerk GMBH, German automobile manufacturers, who had purchased it from Studebaker-Packard. Okonite paid \$4,205,000 and will install equipment to manufacture cables.

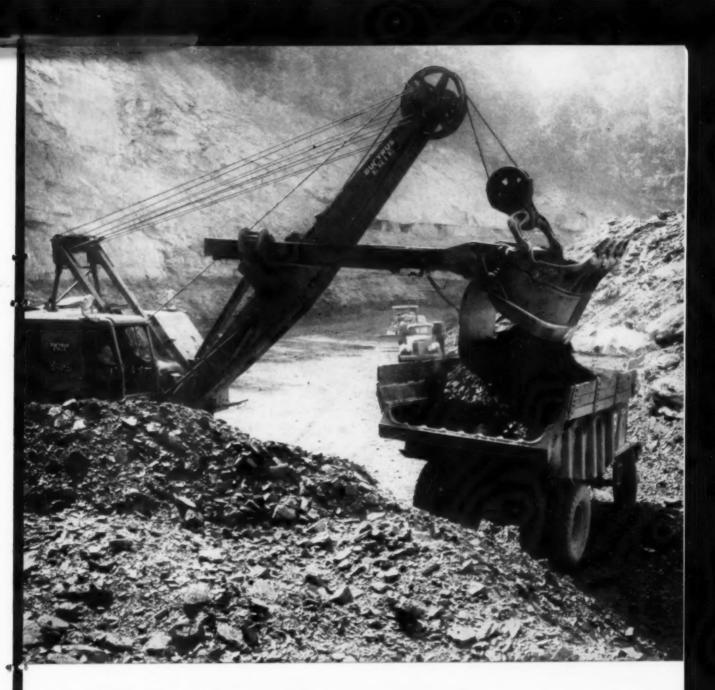
Warren L. Howes was appointed manager of Western Knapp Engineering Co., Div. of Western Machinery Co. Mr. Howes was the company's eastern division manager before the appointment.

William Swaim is sales and service representative for C & D Batteries in the Rock Island, Ill., area.

Howard W. Arnold, a Chicago area sales representative for Carboloy Dept., General Electric Co., is the new manager of distributor sales. Mr. Arnold's office will be in Detroit, Mich. In another promotion Carboloy named Robert J. Mason as manager of the company's Atlantic district. Mr. Mason, a carbide sales and







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On a mountainside in West Virginia, overburden up to 80 feet in height—sandstone, shale, and slate—is blasted with the correct type of Hercules* dynamite to uncover seams of coal 7 ft. thick. Speedy, economical shovel-loading operations are maintained by loosening the coal with small charges of explosives.

Hercules has long pioneered in developing explosives for every type of project. Our experience and service facilities can help you solve blasting problems in mining, quarrying, construction, seismic explorations—wherever explosives are needed to get a job done.

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Manufacturers (Continued)

service engineer since 1950, succeeds E. R. Almdale, resigned.

P. F. Smith was appointed dealer sales manager of Schramm, Inc., West Chester, Pa. Mr. Smith had been with the Pneumatic & Electric Equipment Co. (PEECO), Philadelphia, Pa., before the appointment.

Goodman Mfg. Co., Chicago, Ill., hired John M. Westfall. Mr. Westfall will join the sales staff. Before the appointment, he was associated with the Uniontown Coal Mining Co. and du Pont. Don A. Rohrenbach was assigned to the New York sales office of Gardner-Denver after completing a sales training course at the company's offices in Quincy, Ill.

C. Richard Sword is manager of sales for Aerovent Fan Co., Inc., Piqua, Ohio. He replaces James F. Tilton. Mr. Sword has been assistant manager of sales since 1952.

Merts Equipment Co., Albany, Ga., will sell and service the Michigan line of tractor shovels and excavator cranes, products of the Construction Machinery Div., Clark Equipment Co., Mich. Merts will serve 16 Georgia counties. John D. Fess was appointed district manager of the Pittsburgh office of the Okonite Co. He was northwest manager before the appointment.

Jeffrey Mfg. Co., Columbus, Ohio, appointed The Fairmont Supply Co., Fairmont, W. Va., its distributor of conveying, power transmission and processing equipment.

Books for Coal Men

Economic Geography

Economic Geography of Industrial Minerals, edited by Albert S. Carlson. A detailed work covering the economic, technological and geographic conditions of the various industrial minerals and showing the combination of factors that determine the present location of an industry and future possibilities. 494 pp. 7x104-in; cloth. \$12.50, Reinhold Publishing Co., 430 Park Ave., New York 22, N. Y.

Core Drilling Fundamentals

Basic Procedures of Diamond and Shot Core Drilling describes in non-technical language the basic procedures of core drilling. Included in the booklet are suggestions and photos on setting up diamond and shot core drills and hints for successful drilling with the two types of units. 53 pp. 6x9 in; paper. \$1, Acker Drill Co., Inc., Scranton, Pa.

Revised ASTM Standards

Book of ASTM Standards is the 1955 edition of the triennial publication of the American Society of Testing Materials. Issued in seven parts, each pertaining to a particular area or group of areas of materials, the complete work has 11,000 pages with more than 2,150 standard specifications, tests and definitions. The complete set is priced at \$84; Part 5, dealing with fuels, includes 1,496 pages of text and 242 standards and is priced at \$11. American Society for Testing Materials, 1916 Race St., Phila. 3, Pa.

Mine Locations

A new map of southern coal mines shows the locations of all coal mines on the C & O, N & W and Virginian Railways in southern West Virginia, southwest Virginia and northeast Kentucky. \$5. William P. Schrinner, P. O. Box 617, Bluefield, W. Va.

Ohio Coal Reserves

The Pittsburgh No. 8 and Redstone No. 8A Coal Beds in Ohio, by Richard De Long, gives a detailed estimate of the original reserves of Pittsburgh and Redstone coals in Ohio. Reserves are listed by townships and counties and classified as proven, probable and strongly inferred. 49 pp. with illustrations. 50¢. Ohio Division of Geological Survey, Orton Hall, Ohio State University, Columbus 10, Ohio.

VISI-GARD

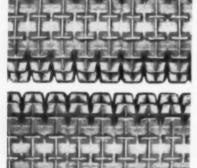
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** Shaped Right to Hang Right!

** Will Not Support Flame!
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The chart at the right shows results of four different tests made with the Gundlach 2 Stage Crusher, using Southern Illinois Coal. Only with Gundlach patented crusher rollers could such percentages be realized. Let us demonstrate the Gundlach crusher at your mine . . . with your

coal . . . with no obligation to you!

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MACHINE COMPANY

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STOKER REALI- ZATION %	91.64	88.30	81.84	82.30
CARBON (FINES) %	8.36	11.70	15.13	17.04
		0.0		

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We manufacture a wide variety of accessory equipment for diamond drilling and soil sampling and carry all essential items in stock for prompt delivery. A NEW CATALOG, No. 400, not only illustrates and describes each item but also gives piece numbers and shipping weights. Write to day for a free copy; it will help you to save time and money.

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For more than seventy years, Sprague & Henwood, Inc. has been a leader in the field of Contract Diamond Drilling and Soil Sampling. During this long period of time our crews have completed thousands of contracts successfully, under every conceivable operating condition. Today, we have a large force of expert oper-

ators and an ample supply of modern equipment, so that we can undertake practically any job anywhere, on short notice. Inquiries for all types of contract drilling work are solicited — estimates submitted promptly without charge or obligation.

SPRAGUE & HENWOOD, INC.

NEW YORK * PHILADELPHIA * PITTSBURGH * GRAND JUNCTION, COL. * BUCHANS, NEWFOUNDLAND * EXPORT REPRESENTATIVE. PHILLIPS EXPORT CO. 100 EAST 42nd STREET, NEW YORK, N. Y.

The Year Advertising Helped

IN 1954 we had a business recession in the United States. Sales fell about 4% during the year. If management had followed the historic pattern of business ups and downs, advertising volume would have fallen much further.

But in 1954 the volume of advertising did not fall. It increased over 5%. Every effort was made to stimulate sales when sales were needed to sustain prosperity.

This was something entirely new under the sun. It had a powerful influence in making the recession of 1953-54 one of the mildest on record. It helped greatly to speed business on to the record-breaking levels it has attained today.

There are several reasons why America's business management attacked this decline in sales with more advertising. One of them grew out of the greatly strengthened position of the American consuming market. Consumers' income after taxes has been rising an average of over \$10 billion a year since 1946, and this rising income is more widely distributed than ever before. Furthermore, consumers have piled up reserves of about \$215 billion in cash or its

equivalent. These reserves offer a new and powerful inducement to increased selling and advertising effort even in the face of a possible decline in consumer income.

Taking the Longer View

However, the principal reason why a sales decline was attacked with increased advertising is management's new-found conviction that good advertising is essentially an investment in the development of a market. Successful development requires sustained investment. The inclination of business management to take this longer view, is, of course, motivated by the fact that the American market, with over 3 million consumers being added annually, is growing at a prodigious rate.

Ten years ago only a handful of companies had plans for investment in new producing facilities extending beyond the current year. Today almost all leading companies have investment programs running some years ahead. And keeping pace with these long-range business investment plans has been the development of sales and advertising programs to



Kill a Business Recession

reach tomorrow's greatly expanded markets.

This crucial role of advertising in providing driving power for our economy is gaining greater recognition every day. In his recent book, "People of Plenty," Professor David M. Potter of Yale University remarked: "Advertising is not badly needed in an economy of scarcity, because total demand is usually equal to or in excess of total supply, and every producer can normally sell as much as he produces. It is when potential supply outstrips demand—that is, when abundance prevails—that advertising begins to fulfill a really essencial economic function."

Advertising's Key Role

Today abundance so completely prevails in the United States that it has been conservatively estimated that as much as a third of everything offered for sale falls in the realm of "optional consumption." That is, consumers can "take it or leave it" without any immediate personal inconvenience. But if they decide to "leave it," a terrific economic depression will not be far behind. In such circumstances, advertising—in

which, in all of its forms, we are now investing about \$9.2 billion annually—clearly is of crucial importance to our continued prosperity.

In performing its key role in past years, American advertising never realized its full potential. It successfully promoted sales. But it never was called upon to promote an overall economic stability as a direct outgrowth of increased sales.

By successfully promoting both sales and economic stability, as it did in 1954, advertising surely has added new strength to the American economy. It has also added a great new and constructive dimension to advertising itself. This accomplishment gave great significance to the celebration of the first National Advertising Week in February, 1956.

One of the surest means of expanding your sales volume in today's \$150 billion industrial market is through dominant advertising in the publications directly serving your major customers and prospects.

McGraw-Hill's business and technical publications can give you quick access to the men who initiate, specify and approve the purchases of industrial products and services. Because all are leaders in their respective fields, you are assured a maximum return on your investment when you specify a McGraw-Hill publication to carry your advertising to your most important markets.

PROFESSIONAL SERVICES

NEWELL G. ALFORD

Consulting Mining Engineer

Coal Property Prospecting Development Operation and

Oliver Building

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42 Years' Service to the Coal and Salt Industries and Consultants struction Engineers and Managers Authoritative Reports and Appraisals 332 S. Michigan Ave., Chicago 120 Wall Street, New York City

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TEMPLETON-MATTHEWS CORPORATION

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MODERN COAL PREPARATION PLANTS THRU "CO-OPERATIVE ENGINEERING" 206-98 Sycamore Bidg. Terre Haute, Indiana

J. W. WOOMER & ASSOCIATES

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SEARCHLIGHT SECTION

WANTED TO BUY OR LEASE

Substantial acreage of low volatile coal, virgin or under operation.

Submit full details with price or lease terms to

Bax No. C.A.-46, Suite 1600 Times Tower, New York 36, N. Y.

FOR SALE

Barber-Greene Ditcher
Model 710, S/N 492—Special Coal Cutting Machine for Trenching 5½" wide and 42" deep—Machine in Excellent Condition. FOB Indianapalis, Indiana. \$4,500.00.

Flesch-Miller Tractor Company Indianapolis 26. Ind.

FOR SALE

Fairbanks. Morse — Pomena Pump. 30 M.P., 1760 R.P. M. 220 3.60 Motor: 16% x 8 surface Discharge Head Assembly: 385 feet 5 inch Discharge Clustering; 13.16 inch Drive Shaft; A 15 stage 6" Pomena Bowler Assembly, 3" strainer: 29500 Size Cutfer Namer Motor Starter; 11 x 3 Re-ducing Flange; 4" Wire

Tonzo D. Evens, Agent Route #3, Chariton, lowe

WANTED:

1,000 to 2,000 ft. 30° belt structure with idlers, "knock-down" type, overall height not over 18°. For use on 52B Jeffrey, Goodman, Hewitz-Robias or Barber Greene conveyors. Advise location and condition.

W 1162 COAL AGE 330 W. 42 St., New York 36, N.Y.

Wanted:

TIPPLE FOREMAN ELECTRICAL ENGINEER INDUSTRIAL ENGINEER

By a progressive coal mining company. Send complete written story of age, education, experience and earnings to

P1096 COAL AGE 1125 W. 6th St., Los Angeles 17, Calif.

5000 ACRES OF COAL LAND FOR LEASE OR SALE

5000 acres of coal land for lease or sale. Located in the coal fields of eastern Kentucky and western W. Vo. Near Kermit and Wil-liamson, W. Vo.

REPLIES (Box No.): Address to office nearest you NEW YORK: 330 W. 42nd St. (36) CHICAGO: 520 N. Michigan Ave. (11) SAN FRANCISCO: 68 Post St. (4)

POSITION VACANT

Engineer — Graduate — excellent opportunity for qualified individual to handle sale of mining equipment. Desire man experienced dealing with higher management. Age 30-40 years. Travel re-quired. Established company. Replies confidential. Address P-1184, Coal Age.

POSITIONS WANTED

Position Wanted—Coal mine general superintendent or auperintendent. 20 years experience in all types and phases of coal mining. Thoroughly experienced in mobile, track and belt mining. References on request. Write in care of PW-9565, Coal Age.

Licensed Civil Engineer, 37 years old, desires engineering or supervisory position with permanent stripping operation. College education and 14 years experience in time and motion study, test drilling, tipple erection, road construction, mapping and overburden preparation. Further details and references on request. PW-1145, Coal Age.

BUSINESS OPPORTUNITY

Coal Mine for sale, located on C. M. & Pacific railroad, centre of uranium field, future pos-silities unlimited. Write Williams Coal Co., Roundup, Montana.

Don't forget the

BOX NUMBER

When answering the classified advertise-ments in this magazine, don't forget to put the box number on your envelope. It's our only means of identifying the adver-tisement you are answering.

EQUIPMENT FOR SALE OR TRADE

-36" t.g. ACF Drop Bottom -36" t.g. Sanford Day Drop Bottom -Battery Lecomotive, 42" t.g.— New -9-30 Goodman TRACKLESS EQUIPMENT TRACKLESS EQUIPMENT

-12BU 9E as is or Rebuilt

-8BU as is or Rebuilt, 500 volt

-8BU as or Rebuilt, 500 volt

-8BU 30 or Rebuilt

-8BU 1-300 KW Coneral Electric Mercury Arc Rectifier 250 volt DC TIPPLE EQUIPMENT TIPPLE EQUIPMENT

1-5' Morrow Shaker Screen
4-2 ton Boom Holst AC
1-42' Loading Boom
1-48' Loading Boom
1-48' Loading Boom
1-85' Loading Boom
1-85' Loading Boom
1-85' X 25' Belt Conveyor
1-85' x 25' Belt Conveyor
1-86' x 75' Belt Conveyor
1-86' x 25' Belt Conveyor
1-86' x 25' Belt Conveyor
1-30' x 209' Belt Conveyor
1-30' x 209' Belt Conveyor
1-31' x 200' Belt Conveyor
1-31' x 30' Belt Conveyor
1-31' CONVEYORS (W) 2-95A Goodman Belt Conveyors, 24" wide approximately 1000' centers, complete less 2—95A Goodman Belt Conveyors, 2 approximately 1000 centers, comp. boilt 1 defrey Room Conveyors 2—61MG Jeffrey Room Conveyors 2—61MG Jeffrey Race Conveyors 4—612's Goodman Shaker Drives 2—210 Goodman Shaker Drives 1—P172 Long Piggyback 2—157 Jey Chain Carveyors 1—107 Medic C, 307 750° Belt Line 3—MTE Joy 30°, 560° Bet Line 30°—25° MTB Structure Alone (W) MISCELLANEOUS LOCOMOTIVES & MINE CARS CUTTING MACHINES 1—1224 Goodman Rubber Mounted 1—824 Goodman, 42° 1.8. 4—512 DA Goodmans

WILL PAY TOP DOLLAR for Cat mounted loaders, shuttle cars, cat trucks, rubber mounted cutters, belt conveyors, rectifiers, and other late type equipment.

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BOUGHT AND SOLD

We carry a large stock of rebuilt and guaranteed transformers, and invite your inquiries.

Custom-built transformers and coils manufactured to your specifications.

Expert Repair Service-all makes and sizes of transformers rewound, repaired and redesigned. Ask for our price schedule.

THE ELECTRIC SERVICE CO., INC.

5322 Hetzel St.

Cincinnati 27, Ohio

40 Years' Dependable Service

FOR SALE

1—1125DCS, 300 h.p. Buda Diesel Engine, disassembled and complete with all parts. Also over \$5,000.00 worth of spare parts for 1125DCS Buda diesel engines, new and used. Offered for sale complete \$2500.00. Cummins Diesel 50 KW Alternator Generator Set, completely rebuilt. - \$3900.00

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ROCHESTER I NEW YORK

COAL HANDLING EOP'T.

Includes Skip Hoist, Track Hopper, Feeder, Crusher, 4000 Cu. Ft. Steel Storage Bin, Scales and Building.

COAL PULVERIZING EQP'T.

2-3 Ton Pulverizers complete with Magnetic Separators.

BOILER

75,000 # per hour, 400 PSI Heine water tube with water walls and Superheater, complete.

ALL ABOVE PRICED FOR QUICK SALE

HEAT & POWER CO., INC. 60 EAST 42ND ST. HEW YORK 17, N. Y. MURRAY HILL 7-5280

SHOVELS - DRAGLINES DRILLS TRACTORS - TRUCKS

190-B Bucyrus-Erie Elec. 8 yd. Shovel 170-B Bucyrus-Erie Elec. 6½ yd. Shovel 1600 P&H 6 yd. Electric Shovel 2400 Lima 6 yd. Diesel Shovel 120-B Bucyrus-Erie Elec. 5 yd. Shovel 111-M Marion 31/2 yd. Diesel Shovel 955 P&H 2½ yd. Diesel Shovel 7400 Marion Elec. Drag 200' boom, 8 yd. 625 Page Diesel Dragline 160' boom, 9 ½ yd. 2400 Lima Diesel Dragline 130', 5 yd. 4500 Manitowoc Diesel Dragline 120' boom. 5 yd. 1055 P&H Diesel Dragline 80' boom, 4 yd.

3500 Manitowoc Diesel Dragline 85' boom,

21/2 yd. bucket 3500 Manitowoc Erection Crane, 120' boom, jib-air control

802 Lima 50-ton Erection Crane & Dragline, 70' boom, 18' jib Two TC Woolridge 15 yd. Terra Cobras 600 Reich Heavy Truck Mounted Rotary Drill

Quarrymaster Drill with 2-500 cu. ft. compressors

58-BH Joy Champion Rotary Air Drill 56-BH Joy Middleweight Rotary Air Drill Also 42-T, 29-T, and 27-T Well Drills

Euclid Trucks-Many to Choose From FRANK SWABB EQUIPMENT CO., Inc.

313 Hazleton Nat'l, Bank Bldg. Hazleton, Pa. GLadstone 5-3658

80 X 51

BOX CAR LOADERS ROTARY DUMPER I—II HP Vulcan, single drum
I—20 HP Vulcan, single drum
I—21 HP Vulcan, single drum
I—22 HP Vulcan, single drum
I—35 HP Vulcan, single drum
I—36 HP Vulcan, single drum
I—37 HP Vulcan, single drum
I—38 HP Vulcan, single drum
I—38 HP Vulcan, single drum
I—39 HP Vulcan, single drum
I—39 HP Vulcan, single drum
I—39 HP Vulcan, single drum
I—36 HP O'tunewa single drum
I—375 HP Bax single drum
I—375 HP Bax single drum
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I—376 HP O'tunewa single drum
I—378 HP Bax single drum
III MP II ELECTRIC HOISTS

RAIL

We have in clink good relaying rail 16.5 to 100.5, slap new rail and Strings, 12.5, 16.5 and 28.5

LOADERS & CONVEYORS

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Industrial Machines A.C.

I—78 Sullivan super shertwall

I—88 Julivan CE2

I—28 Julivan CE2

I—28A Julivan

S—112A Geodman

3-78 Sullivan super shortwall 2-T-1 Joy crawlor type trucks 3—100 ton Foirbanks railroad sealed

1—125 ton Howe railroad scales

COAL CARS

80—60 cu. ft. Card steel, end dump, 38" ga.

88—68 cu. ft. Card steel, ond dump, 38" ga.

71—107 ca. ft. Watt steel, end dump, 48" ga.

We have been authorized by the United States Bureau of Mines to repair and rebuild permissible equipment and to replace and affix permissible plates within existing requirements. Since 1898 Dependable Reconditioned Machinery

MORSE BROS. MACHINERY CO.

2900 BRIGHTON BLVD.

EST. 1898

DENVER 1, COLO.

MINE EQUIPMENT FOR SALE

-MH-77 Locomotive 15-ton, Rebuilt, 250-Volt, 44" Gauge, Armor Plate Side Frames.-Excellent Condition.

6-12 BU-9F Joy Loading Machines, 500-Volt. Good Condition.

4-8 BU-11 E or F Joy Loading Machines 250 or 500-Volt, 311/2 high with Long conversion for piggyback conveyors.

8-PT-12 Long Piggyback Bridge Conveyors complete. Used one

THE NEW RIVER COMPANY

Mount Hope, W. Va.

FOR SALE 4500 MANITOWOC

11/2 years old—looks like new. D-386 Cat engine; 120' boom, 5 vd. bucket.

FRANK SWABB EQUIPMENT CO., INC. 313 Hazleton Nat'l, Bank Bldg. GLadstone 5-3658 Hazleton, Pa.

SHUTTLE CARS

I—Joy model 4205, battery operated 3—Joy model 6003P, battery operated 7—Joy model 6001, battery operated

MINE FANS

I—120" Joy La-Del axial flow fan, i 1—3H Jeffrey 42" aeredyne fan 1—7' Jeffrey aeredyne 2 stage fan 1—3600 efm Claridge blower, 3 HP axial flow fan, model L-14 prodyne fan

BATTERY LOCOMOTIVES

-4 ton Westinghouse, 24° ga. - ton Ironton, 38° ga. -5 ton General Electric, 36° ga. -7 ton General Electric, 38° ga. -8 ton General Electric, 38° ga. -8 ton General Electric, 38° ga. -8 ton General Electric, 38° ga. -10 ton Atlas, 38° ga.

TROLLEY LOCOMOTIVES

TROLLEY LO

-2'/, T. Jeffrey, 36" ga.
-4'/₂ T. Goodman, 36" ga.
-5 Jeffrey, 36" ga.
-6 T. Goodman, 42" ga.
-8 T. Goodman, 42" ga.
-8 T. Goodman, 42" ga.
-13 T. Goodman, 42" ga.
-13 T. Jeffrey, 42" ga.
-15 T. Jeffrey, 42" ga.

BATTERY CHARGERS

BATTERY CHARGERS

-0.2 KW B. 130/182 V., 15 HP moter. 440V. AC

-0.5 KW Hertner. 103/120 V., 15 HP moter 440V.AC

-1.1 KW West., 125 V., 175 HP. 440 V. AC

-1.1 KW West., 125 V., 175 HP. 440 V. AC moter

-1.3 KW Ext., 125 V., 175 HP. 440 V. AC moter

-1.5 KW Ext., 125 V., 175 HP. 440 V. AC moter

-1.5 KW Ext., 125 V., 175 HP. 440 V. AC

-250V D. C. battery charging witchboards

-1.9 battery charger, model U-248-206 E 128.3 volts

-1.9 battery charger, model U-248-206 E 128.3 volts

-1.9 battery charger, model U-248-206 E 128.3 volts

-1.9 battery charger, model U-248-206 E 129.5 volts,

-1.9 battery charger, model U-248-206 E 129.5 vo

ROCK DUSTERS

I-M.S.A. type A, 2 HP 250V, DC meter I-M.S.A. type A, 440 V, AC meter I-M.S.A. #58-1105, 20 HP 230 V, DC meter

M-G. SETS & ROTARIES

MW. Westh. 275 V.—2300 V. MG. Set. KW. GE. 275 V.—2300/4000 V. MG. Set. KW. Westh. 500 V.—2300 V. MG. Set. KW. GE. 275 V.—2300/4000/440 V. MG. Set. KW. GE. 275 V.—2300/440 V. MG. Set. KW. Westh. 275 V.—2300/440 V. MG. Set. KW. Westh. 275 V.—220/440 V. MG. Set. KW. Westh. 275 V.—220/440 V. MG. Set.

500 KW, GE. HCC-6-275 V. 1200 RPM. Rotary. 300 KW, GE. HCC-6-275 V. 1200 RPM. Rotary. A.C. & D.C. MOTORS—TRANSFORMERS— COMPRESSORS—PUMPS—HOISTS

MOORHEAD ELECTRICAL MACHINERY CO. OAKDALE, PA.

NEW and REBUILT STORAGE BATTERY

LOCOMOTIVES

11/4 to 10 Tons 18" to 561/4" Track Couge GREENSBURG MACHINE CO. Greensburg, Pa.

FOR SALE

42" Gauge Mine Cars 44-All-Steel rotary dump, ACF 12' x 6' x 3', 5 ton, roller bearing.

-Composite, end dump, 121/2' x 6' x 3',

Blueprint available for both types. Located for easy loading on CGO at Van, W. Va.

Call or Write:

Western Pocahontas Corporation P. O. Box 509, Huntington, W. Va. Phone 28268.

PLYMOUTH KOPPEL locomotives mine cars

We are offering the following equip-ment for sale. Operation will be demonstrated upon inspection at our Mine

(1) Plymouth Model DLC 8-ton, 36" Gauge, 4 wheel, gasoline locomotive, serial no. 3708, equipped with JXC Hercules Engine. Size 334 x 414", coupled to a Fuller Model 12-S Hydraulic Torque Converter.

(1) Model FLB, 5-ton, Plymouth Gasoline Locomotive, serial no. 3494, 36" Gauge, equipped with Model KTU Hercules JXC engine no. 1649163, size 334 x 414".

(9) 3 Cubic Yard Capacity, ...oppel V shape, heavy duty, all steel side dump cars. Cars are 36" Gauge, dump body 6 feet long, width at top 7 feet, depth 40 inches, extreme width of car 7 feet 6 inches, height from top of rail to top of body 5 feet 7 inches, wheel diameter 18 inches. Link and pin couplers.

LEE CLAY PRODUCTS COMPANY, INC.

CLEARFIELD, KENTUCKY

Phone: Morehead-89

FOR SALE

Peerless Brand New Submersible Pumps Peerless Brand New Submersible rumps 250 GPM at 47 foot head, Brass construction with 75 foot cable, check valve, strainer and controller. Outlet for 2½" Hose, 4 H.P.— 230 Volt DC, Dimension—9" Diameter x 29" long. Government Cost \$991.00 ea.

Price-\$125.00 ea. F. O. B. West Trenton or Ogden, Utah

FRANKLIN MACHINE PRODUCTS CO., INC. WEST TRENTON, NEW JERSEY

> FOR SALE Quarrymaster Drill In New Condition

We have no further use for this machine. Any reason-able offer will be accepted. Call or write:

GILBERTON COAL COMPANY
P. O. Box 423, Gilberton, Pennsylvania
Telephono: Frackville 602

FOR SALE

Complete coal testing laboratory.

All necessary equipment for full proximate analysis, including crusher, pulverizer, moisture, ath and volotile ovens, calorimeter, balances,

F. Phillippi Cadiz, Ohio Phone 418

FOR SALE

Fine-Coal Washer, Will Handle A Feed Of 50 Tens Per Hour Of 15" Or 16" X 8" Coal, Complets Wite Piging, Pumps, Motors And Controls, Will Incide Devatering Screens If Desired, Equipment is in First Class Condition.

FS1124 Coal Age 330 W. 42nd St., New York 36, N. Y.

USE MONEY? YOU

J. T. FISH can use any kind and quantity of loaders, cutters, shuttle cars, substations, meters, rails, complete mines and what not. No quantity too large or small. We pay fair prices the year round regardless of seasonal fluctuations. So if you can use our money, we can use your mining equipment. Let's get together!

We Own What We Advertise

I-200KW, G. E. HCC-8 Retary Converter, 275 DC.
3-300 KW, G. E. HCC-8 Retary Converter, 275 DC.
1-200 KW Westingnouse Retary Converter, 275 DC.
1-300 KW Westingnouse Retary Converter, 275 DC.
1-300 KW Westingnouse Retary Converter, 275 DC.
1-300 KW Westingnouse Retary Converter, 275 DC.
(All the above with 3000/13000 and-or 2300/46 primary transformers.
2-200 KW MG Set, Westingnouse.
1-200 KW MG Set, General Electric.
2-300 KW MG Set, General Electric.
1-300 KW MG Set, General Electric.

perfect.

LOCOMOTIVES

-Jeffrey 20 ton, type M H - I 10

-Jeffrey 13 ton, type M H - I 10

-Jeffrey 10 ton, type M H - I 10

-Jeffrey 10 ton, type M H - I 10,

-Jeffrey 10 ton, type M H - 78, 42" and 48" Gauge.

-Jeffrey 8 ton, type M H - 10, 42", 44" and 48"

4—Jeffrey 8 ton, type MH-100, 42", 4" and 48" Gauge.

2.—Jeffrey 6 ton, type MH-98, 42", 4" and 48" Gauge.

3.—Jeffrey 4 ton, type MH-94, 42", 44" and 48" Gauge.

3.—G.E. 6 ton, type 825 Locemetives, 20" high.

4.6" and 48" Gauge.

4.6" and 48" Gauge.

3.—G.E. 10 ton, type 825 Locemetive, 42", 44" and 48" Gauge.

"B. E ton. you did "Gause.

-G.E. B ton. type B22 Locometive, 44" "Gause.

-G.E. 10 ton. type B08 Locometives, 42", 44"

-46" Gause.

-Goodman 5 ton. type 32A, 44" and 48" Gause.

-Goodman 5 ton. type 32A, 44" and 48" Gause.

-Westingheome. type 962, 4 ton.

-Westingheome. type 966.

-Westingheome. type 966.

-Westinghouse. type 967, 10 ton.

-Gaseline and Diesel Locometives, 4 to 10 tons.

-Thousands of other 1

6—Jeffrey 25UC Universal on cats.
4—Baby Goodman 212*s, rebuilt.
3—Goodman 312*s, is* high.
3—Goodman 312*s, is* high.
3—Goodman 512*s, hydraulis.
3—Goodman 512*s, hydraulis.
3—Goodman 512*s, hydraulis.
3—Goodman 224 Slabbers.
3—Goodman 224 Slabbers.
4—Goodman 224 Slabbers.
4—Jeffrey 250*c on cats.
4—Jeffrey 250*c on cats.
4—Jeffrey 358*s and 358*s.
4—Jeffrey 250*c on track.
4—Jeffrey 250*c on track.
4—Jeffrey 250*c, track mounted.
4—Jeffrey 250*c, track mounted. LOADING MACHINES

14—Joy Loaders, all types,
2—Jeffrey & OLAF on rubber, 25".
3—Jeffrey L. 500 Loaders,
3—Herry What No. Automat Loaders,
4—Clarken Loaders, 28" above raif. LOADING MACHINES

6—Jeffrey 61AM Reom Conveyors, 300 ft.
16—Jeffrey 61AM Reom Conveyors, 300 ft.
25—Jeffrey 61AM Reom Conveyors, 300 ft.
25—Jeffrey 61AM Reom Conveyors, 300 ft.
26—Jeffrey 15* Reom Conveyors, 300 ft.
26—Jeffrey 15* Reom Conveyors, 101 fe 40 H. P.
26—Jeffrey 15* Reom Conveyors, 101 fe 40 H. P.
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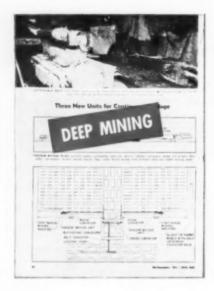
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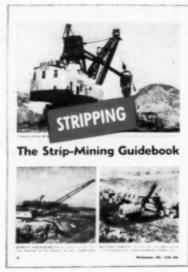
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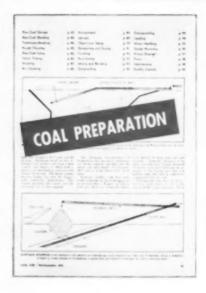
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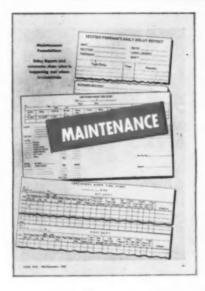
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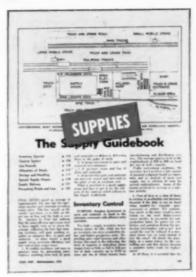
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Guidebook of help on "Face preparation and roof control. This Guidebook is very useful to me. We are planning a new operation and the Guidebook covers every possible phase."

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"Have used Buying Directory. I think the idea of consolidating leading articles and other data in an annual number is of much value to the industry. It has always been a problem to keep tear sheets and this seems to be a good solution for ready reference."

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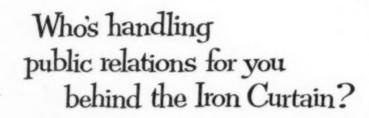
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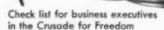
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Yellow Strand Flattened Strand whips these problems because it's made of strands laid up in a triangular form (see illustration at right).

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spooling over drums. And because of its construction, Yellow Strand lasts longer—up to twice as long in many cases. So order Yellow Strand Flattened Strand from your Distributor the next time you stop in to see him.

COMPARE Uellow Strand FLATTENED STRAND





with ordinary wire rope (right). In Flattened Strand you have twelve contact points, greater contact area, smoother surface, less wear. Result: longer service, lower final cost!

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In just four months this Caterpillar D8 Tractor has racked up 1660 hours, working 16 hours a day, six days a week for DuBois Coal Mining Company of Clearfield, Pa. It is shown here backfilling shale for land reclamation at a coal strip mine near Glenhope.

This is the kind of round-the-clock dependability that DuBois expects from its Caterpillar equipment. The company also owns another D8, three D7s and five CAT* Engines in cranes. "We're very satisfied with Caterpillar products," says B. M. DuBois, Sr., company president, "and with the good, fast service we get from our dealer. We wouldn't have any other tractor but Caterpillar on our job."

And now there is a new D8 Tractor: Series D with three-stage torque converter, Series E with Caterpillar's exclusive oil clutch. With a new 191 HP Caterpillar* Diesel Engine, it's built to handle even more material at even lower cost. It's available with the No. 8U Bull-dozer blade (shown here) for big-load materials-handling, and with the rugged No. 8A or No. 8S blade for stripping and other 'dozer-busting work.

Operator efficiency is increased in the new Caterpillar D8 Tractor by such features as in-seat starting, easier handling controls, and "live-shaft" drive for operation of attachments independently of the flywheel clutch. Now more than ever, the D8 is tough, trouble-free and traditionally Caterpillar with such long-life features as "water-quench" hardened track shoes, "Hi-Electro" hardened cylinder liners, and highly effective filters and seals to keep lubricants in and grit out of the engine and other moving parts.

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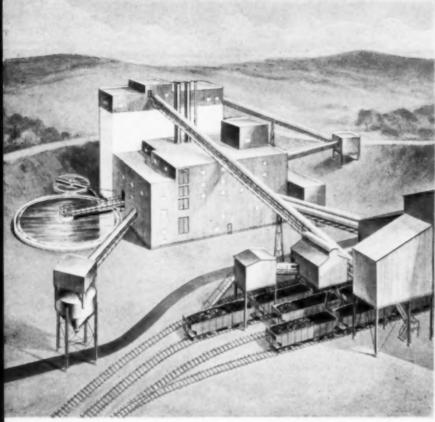
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LINK-BELT completes single-contract job for entire Joanne preparation plant



JOANNE plant, at Rachel, W. Va., is the most recent example of Link-Belt "turn-key" service. From Pittsburgh Seam, 24" maximum lumps are reduced to 5" x 0" metallurgical and 5" x 0" steam coal. Link-Belt equipment includes complete conveying system, new air-pulsated wash box, two Multi-Louvre dryers, crushers, screens, thickener, feeders, drives.

It's another metallurgical coal plant built and erected by LINK-BELT

Here's the assignment Sharon Steel Co. handed Link-Belt: Full preparation facilities for handling 350 tph of run-of-mine coal and producing a uniform metallurgical and steam coal, 3.0% moisture content. And from foundation to finished plant, the job was completed under a single, all-inclusive contract.

Basis for this confidence is Link-Belt's previous experience in handling complete metallurgical coal plants . . . plus countless other installations, ranging from individual components to entire modernization plans. And this same dependable equipment and capable engineering provide the low-cost handling and processing procedures that can be arranged to suit your own particular seam and market requirements.

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PRICE, Ky., is the site of Inland Steel Co.'s model preparation plant, where ash content of 750 tph of raw coal is reduced to 3.5%.



WEIRTON mine—washing and blending plant built by Link-Belt to produce 250 tons of 4" x 0" coal per hour for Weirton Steel Co.



ISABELLA, Pa.—Link-Belt cleaning, drying and blending plant of 300 tph capacity has provided Weitton Coal Co. with a clean, uniform product